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FILARIAL LYMPHATIC VARIX.[1]

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Since Demarquay[2] discovered embryo filariæ in chylous fluid from the tunica vaginalis, numerous observers, in great part English physicians residing in the British colonies, have demonstrated the frequency with which filarial infection occurs in tropical countries. In 1868 Wucherer[3] noted the presence of filariæ in chylous urine, and in 1879 Lewis[4] recorded their presence in the blood. It was not until 1876 that Bancroft,[5] examining a suppurating lymphatic varix of the arm, found the adult female worm to which Cobbold, recording the discovery, gave the name Filaria bancrofti.

The parasite has a wide geographical distribution and infects a large proportion of the population of many tropical countries. Manson,[6] in his work on tropical diseases, has collected observations demonstrating the prevalence of filaria on the East and West African coasts, in Morocco, India, Ceylon, the Islands of the South Pacific, British Guiana, and the West Indies. It has been observed in many other tropical countries. In Cochin, a district of Southern India, Manson found one-third of the inhabitants infected, and in Samoa one-half of those examined, while Thorpe[7] in the Friendly Islands found filarial hæmatozoa in the blood of 32 per cent. of natives. A large proportion

[1] Read at the Sixteenth Annual Meeting of the Association of American Physicians, held at Washington, D. C., April 30 to May 2, 1901.
[2] Gaz. Méd. de Paris, 1863, vol. xviii. p. 665.
[3] Gazeta medica da Bahia, December 15, 1868, p. 97.
[4] Indian Annals of Medical Science, Calcutta, 1873–74, vol. xvi. p. 504.
[5] Cobbold. Lancet, 1877, vol. lxviii. pp. 70, 495.
[6] Tropical Diseases. London, 1900.
[7] British Medical Journal, 1896, vol. ii. p. 922.

of infected individuals appear to be in good health, but a variety of pathological conditions with which the parasite has been found associated are undoubtedly caused by its presence.

Numerous investigations have shown that Filaria bancrofti requires two hosts in order to complete the cycle of its life-history. Embryo filariæ are withdrawn from the human body by a blood-sucking insect —the mosquito—and in its body undergo a series of developmental changes. The adult male and female filaria, macroscopic nematodes several inches in length, have been repeatedly found within the dilated lymphatic vessels of the human host. Almost the entire body cavity of the female is occupied by a uterus filled with ova and embryo parasites in various stages of development. The minute worm-like embryos, containing no recognizable organs and enclosed in a delicate sheath, are poured in great numbers into the lymphatic vessels, and hence reach the bloodvessels, where, owing to their small diameter, about that of a red blood-corpuscle, they circulate freely through the capillary vessels. Manson[1] has shown that when blood containing embryo filariæ is drawn into the stomach of the mosquito the parasite loses its sheath, and by active movements makes its way through the stomach wall into the thoracic muscles of the insect, where it undergoes changes by which it acquires a digestive tract and other rudimentary organs. Low[2] has recently found that the parasite makes its way into the head of the mosquito and lies in the loose connective tissue below the cephalic ganglion and salivary duct, finally penetrating the proboscis, where it may be demonstrated by appropriate sections. Here two worms are almost constantly seen together. Manson's early investigations have been, it is well known, the incentive for much of the research which has demonstrated that the mosquito is an intermediate host of the malarial parasite and transfers the protozoon from one human host to another. The discovery of the partially developed parasite in the proboscis of the mosquito indicates that this filaria follows the analogy of the malarial organism, and is transmitted from one individual to another by certain species of mosquitoes, in which it passes the entire period of its existence outside the human body. Investigations of James[3] have confirmed and extended Low's observations.

Low studied the development of Filaria bancrofti in the mosquito Culex ciliaris; James, in Culex microannulatus and Culex albopictus. James has shown that mosquitoes of the genus Anopheles may harbor filariæ, and has traced the development of the parasite in Anopheles rossii. It is, therefore, not improbable that a considerable number of different species may act as intermediate host to Filaria bancrofti. Every infected individual becomes a source of danger to the community in which he lives

[1] Cobbold. Lancet, 1878, vol. lxix. p. 69.
[2] British Medical Journal, 1900, vol. i. p. 1465.
[3] Ibid., vol. ii p. 533.

should an appropriate species of mosquito thrive in the same locality. Constantly increasing intercourse between the United States and tropical countries, notably the West Indies and the Philippine Islands, gives increased importance to this possibility.

Filarial infection is prevalent throughout the West Indies. Guitéras[1] found filariæ in the blood of four Cubans residing at Key West. A case described by Young[2] was that of a resident of Jamaica. The disease appears to be prevalent in the Windward and Leeward Islands. Flint[3] has reported a case from the Island of St. Kitts. Manson[4] examined specimens of the blood from twenty-eight inhabitants of the Island of St. Kitts and Montserrat, and in six found filariæ. In one hundred and fifty-two specimens from the Island of St. Vincent filariæ were found in six. Galgey[5] has found similar parasites numerous in the Island of St. Lucia. The patient of Lothrop and Pratt[6] had lived on the Island of Barbados. The patient whose case is to be described was a native of the Island of St. Thomas.

There is little doubt that the disease prevails to a limited extent in the Southern States, and in a number of instances infection has been acquired within this country. Guitéras found filariæ in the blood of a mulatto, a native of Charleston, S. C., who, though he had lived only in South Carolina and Georgia, suffered with chyluria. In the blood of a second negro suffering with hydrocele Guitéras found filariæ. De Sassure[7] has described twenty additional cases of filarial infection occurring in residents of Charleston, S. C., and in all but two cases the infection was undoubtedly acquired within the United States. Mastin[8] records the case of a white man who had never lived outside of Mobile, Ala., and its immediate vicinity; filariæ were found in chylous fluid withdrawn from the tunica vaginalis. Henry[9] describes a case of filarial chyluria in a girl who had lived only in South Carolina, Florida, and Pennsylvania. Two cases of chyluria with filariæ in the urine are described by Slaughter.[10] The infected individuals had for at least twenty years lived in Virginia a short distance from Washington, and gave no history of having visited any tropical country. Even more surprising is the case described by Dunn.[11] His patient, who had suffered with filarial chyluria, had never been outside of Pennsylvania, and had spent her entire life in Philadelphia. Winn[12] discovered filariæ

[1] Medical News, 1886, vol. xlviii. p. 395.
[2] British Medical Journal, 1897, vol. i. p. 1037.
[3] New York Medical Journal, 1895, vol. lxi. p. 737.
[4] British Medical Journal, 1897, vol. ii. p. 1837.
[5] Ibid., 1899, vol. i. p. 146.
[6] American Journal of the Medical Sciences, 1900, vol. cxx. p. 525.
[7] Medical News, 1899, vol. lvi. p. 704.
[8] Annals of Surgery, 1888, vol. viii. p. 321
[9] Medical News, 1896, vol. lxviii. p. 477.
[10] Ibid., 1891, vol. lix. p. 649.
[11] Transactions of the College of Physicians of Philadelphia, 1898, vol. xx. p. 80.
[12] Indiana Medical Journal, 1896, vol. xiv. p. 409.

in the urine of a patient suffering with chyluria who had resided in the Northern and Western States.

A case of filarial infection imported from the West Indies has recently been studied in the Pathological Laboratory of the Johns Hopkins Hospital. Since the condition is so rarely encountered in this locality, it was not suspected during life, and unfortunately no observations were made upon the living parasite. Few autopsies have been performed on subjects of filariasis, and the pathology of the associated conditions is not well understood.

Clinical History. Male, aged twenty-four years. The patient was admitted to the Johns Hopkins Hospital in the service of Dr. Halsted complaining of abdominal pain and distention. No very definite personal history was obtainable. He was born of Danish parents on the Island of St. Thomas, one of the Danish West Indies. For the past few years he had lived in this country. He has repeatedly had what he describes as "spasms." He has had, he says, a hernia for eight years. The patient was brought to the hospital in an ambulance, Sunday, March 3d. He was well and able to work until the preceding Thursday, when in the evening he had a chill and went to bed. During the "spasm" which followed, his hernia, he says, came down and has not since been reduced, though an attempt was made by a physician. Since Friday he has had severe abdominal pain, has vomited frequently, the vomitus having, it is said, a fecal odor. The bowels have not moved since Thursday morning. Urine was voided with some difficulty and pain.

The patient is a sparely-built man of swarthy complexion. His temperature on admission is 104.2° F.; the pulse, of poor volume, is 136 to the minute. The percussion note over the lower right back and axilla is flat and high-pitched, and the breath sounds distant. The abdomen is symmetrically distended and tympanitic. The spleen is not palpable. White blood-corpuscles number 20,800. In the right groin is a visible tumor consisting of two parts. One part, a rounded mass lying immediately below Poupart's ligament, is 3 cm. in diameter and tender to the touch. It gives no impulse on coughing, but appears to have a slightly resonant percussion note, and was thought to be a strangulated femoral hernia. The second part of the tumor lying below the saphenous opening measures 8 by 3 cm., and feels like a mass of enlarged lymphatic glands. Both testicles can be felt. The left epididymis is somewhat smaller than the right.

An exploratory incision under cocaine anæsthesia was made over the supposed hernia. It was found to consist in part of a mass of dilated channels containing clotted blood, often of chocolate color, in part of denser tissue of spongy texture. This new growth apparently followed the femoral vessels and extended a short distance along the saphenous vein. A part of the mass was removed, the wound was partially closed, and iodoform gauze was inserted into its lower angle.

Since the symptoms indicated the existence of general peritonitis, on the following morning an exploratory incision was made in the median line of the abdomen. Pus and fibrin were found in all parts of the peritoneal cavity, but careful examination of the abdominal viscera failed to reveal any cause for the peritonitis present.

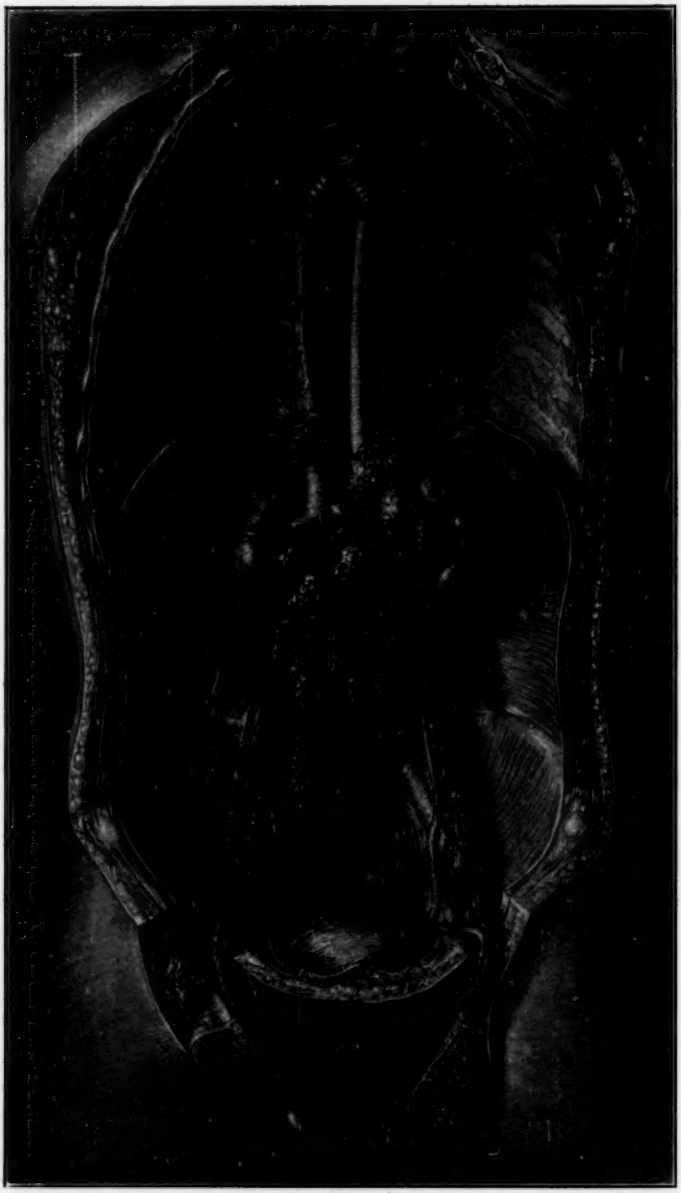
The patient remained weak and restless after the operation. The white blood-corpuscles counted three times numbered from 16,400 to 21,000. The temperature fell to 98° F. after the second operation, but rose to 103.9° F. shortly before death, which occurred on the following day. The urine contained a small quantity of albumin and a few casts, but other alterations were not noted.

Autopsy. The body is that of a sparely-built, well-nourished man. In the right inguinal region is a linear incision, the upper part of which is closed by silver wire. The lower part is open, and from it can be squeezed thin, turbid fluid. The exposed fat is deep red and injected. Through the abdominal wall near the median line is a second closed incision.

The peritoneal cavity contains about 50 c.c. of opaque, yellow fluid. The omentum and several loops of the intestine are lightly adherent to the anterior abdominal wall near the wound, and in places adjacent peritoneal surfaces of the omentum and intestine are lightly held together by fibrinous material. The peritoneal surface is dull, and here and there is covered by fibrino-purulent exudate in small amount. Minute vessels are injected and subserous ecchymoses are numerous. The appendix, curled up in the iliac fossa, is normal in appearance. The right pleural cavity contains no excess of fluid. Its parietal and visceral surfaces are dull and lightly bound together by fibrinous exudate resembling that of the peritoneum, and most abundant over the basal surface of the lung. The left pleural and pericardial cavities show no evidence of inflammation.

The heart weighs 270 grammes. Below the epicardium are numerous ecchymotic points. The valves are delicate. The lungs, resembling one another closely, are deep red in color and exude bloody serum, but are crepitant throughout. The bronchi are slightly injected. The surface of the liver is smooth and of a yellowish-red color, studded with minute ecchymoses. The spleen is not enlarged, weighing 150 grammes, and its capsule is thickened and fibrinous in places. The stomach and intestines are normal throughout. The pancreas is firm in consistence, compact in texture, and of a uniform grayish color. Near the upper border of the head of the organ is an enlarged lymph gland, hemorrhagic on section, and 1.5 cm. in diameter. The mesentery contains lymphatic glands, which are firm, gray-white, and occasionally 1.5 cm. in diameter. No abnormality of the lacteal vessels is noted.

After exposing the retroperitoneal tissue by removal of the above-named organs there is seen a diffuse and extensive new growth, which was previously inconspicuous. It occupies the entire space between the kidneys, and extends along the renal vessels into the hilum of the right. It is in direct contact with both adrenals, but does not invade them. It extends downward in front and on either side of the aorta and vena cava as far as the promontory of the sacrum, and has an average width of 5 cm. and a thickness of only 1 to 1.5 cm. An extension passes into the pelvic cavity to the right of the median line, and forms a flattened mass lying behind the ureter and between the bladder and pelvic wall, having here an average thickness of about 2 cm. The tumor tissue completely embeds the aorta and vena cava below the level of the renal vessels, and sends a lappet in front of the right ureter. It can be readily dissected from the structures with which it is in contact. When the adherent areolar tissue and fat are



The accompanying drawing, which accurately reproduces the appearance of the lymphatic varix described, has been made by my friend, Mr. Max Brödel, to whom I desire to express my obligation. It shows the entire varix in situ. A section for microscopic examination, from the position marked ×, immediately above the left epididymis, contained the adult worm occupying a dilated lymphatic vessel.

removed from its surface the appearance is that of a mass of thin-walled dilated and tortuous vessels containing dark thrombus material. Convolutions projecting forward give a nodular aspect to the surface. The tissue is flaccid in consistence, but tough, and on section is found to consist of dilated trabeculated channels, usually 2 to 5 mm. in diameter, lined by smooth endothelium and containing firm thrombus material of dark-red or reddish-brown color. They are held together by a varying amount of fibrous tissue, in which fat is abundant. A flattened continuation of the tumor follows the femoral vessels under Poupart's ligament, covering them for a short distance and lying in the wall of the wound previously mentioned. In this tissue is embedded a lymph gland about 1.5 cm. in diameter. From the tumor mass in the region of the kidney a strand of dilated thrombosed channels resembling those elsewhere passes down along each spermatic vein to the testicle, and forms in contact with the epididymis a spongy fibrous mass which is larger on the left than on the right side.

To the right of the aorta a continuation of the varicose tissue within the abdomen extends upward through the diaphragm and expands slightly immediately above to form a smooth cylindrical mass 2 cm. in diameter, composed of dilated thin-walled sinuses, the lumina of which are broken by irregular trabeculæ and contain brownish thrombus material. This relatively smooth mass lies to the right of the aorta for a distance of 10 cm. above the diaphragm and then becoming irregular in outline, as if composed of separate dilated channels, passes behind the arch of the aorta to the left side of the œsophagus and trachea. The dilated vessels which form it pass between the left subclavian, left carotid and innominate arteries and form in front of them a small mass resembling the tumor tissue elsewhere. In removing the specimen the veins at the base of the neck were cut so that their relation to the tumor mass, which evidently represents the enlarged varicose thoracic duct, could not be definitely determined. At one point there is a communication between a vein occupying approximately the position of the left subclavian and the varix. The orifice in the wall of the vein is about 2 mm. in diameter, and gives entrance to a dilated channel which is filled almost to the surface of the vein by thrombus material resembling that found in the dilated channels elsewhere.

The kidneys, ureters, and bladder appear to be normal. The aorta is smooth throughout, and the inferior vena cava is normal.

Microscopical Examination. Sections made from various parts of the varix-like tumor show that it consists of thin-walled vessels held together by loose areolar tissue containing fat. The vessel walls are formed in great part by fibrous tissue, but contain smooth muscle, often in considerable quantity. (Hypertrophy of muscular tissue is described by Lothrop and Pratt, *loc. cit.*) The lining endothelium is represented by oval nuclei seen at intervals. These vessels have not the structure of veins nor of arteries. Occasionally the smaller channels do not have distinct walls, and are simply dilated spaces within the connective tissue. The lumina are filled with red blood-corpuscles and polynuclear leucocytes in great number lying in a rich network of fibrin. Lymphoid cells occur in small number, and here and there are large endothelioid cells with vesicular nuclei. Sections stained by Weigert's fibrin stain demonstrate the presence of diplococci in great numbers, both free and within leucocytes. The dilated lymphatic vessels are

embedded in fibrous tissue which is infiltrated with polynuclear leucocytes, often very numerous and mingled in places with fibrin and red blood-corpuscles. Occasionally the tissue is denser and more fibrous and contains lymphoid cells.

A section through the varix in contact with the left epididymis shows dense interstitial tissue containing numerous lymphoid, plasma, and eosinophile cells. The section passes through a dilated lymphatic vessel which contains what is immediately recognizable as at least one much-coiled nematode worm cut many times. The body is formed by a musculocutaneous tube covered by a thin cuticle. Its most conspicuous anatomical feature is the bilobed uterus filled with ova and embryos in various stages of development. Some of the latter are coiled up within an oval sac, while others lie stretched out parallel to one another. In all sections the alimentary canal is recognizable as a slender tubule whose cells contain pigment. Several sections appear to belong to a second smaller worm. Its digestive tract is larger, and there is within the musculocutaneous body only one other tubular organ.

Sections from various organs were carefully examined for embryo filariæ. In a small hepatic vein was found a portion of a small worm-like body composed of a cuticle surrounding a central nucleated strand and identical in structure with the intra-uterine embryos.

Bacteriological Examination. Stained smear preparations of the exudate in the pleural and peritoneal cavities contain very numerous capsulated lanceolate diplococci. Cultures from the lymphatic varix studied by Mr. Warfield Longcope contain diplococcus lanceolatus in pure culture. Diplococcus lanceolatus and staphylococcus pyogenes albus were obtained from the peritoneal cavity.

Pathological Diagnosis. Filariasis; lymphatic varix involving thoracic duct, retroperitoneal lymphatic vessels of the abdomen and pelvis, of the spermatic cord and of the right groin; adult Filaria bancrofti within a dilated lymphatic vessel; embryo filaria in a branch of the hepatic vein. Terminal infection of lymphatic varix with diplococcus lanceolatus; fibrino-purulent inflammation of the peritoneum, right pleura and tunicæ vaginales.

A clinical condition referable to the parasite was the presence of a tumor mass in the right groin which, according to the patient's statement, had been for eight years supposed to be a hernia. Autopsy demonstrated the existence of an immense plexus of enormously dilated lymphatic vessels lying in the abdomen and pelvis in front of the vertebral column. Continuous with this plexus was the distended varicose thoracic duct passing beside the aorta to the base of the neck. Dilated lymphatics held together by fibrous tissue followed both spermatic veins as far as the epididymis, and a similar mass of lymphatic vessels passed with the femoral vein and artery under Poupart's ligament and formed the mass which during life was mistaken for a hernia. An adult filaria occupied a dilated lymphatic vessel near the right epididymis, and a single embryo was found in a bloodvessel of the liver. The entire lymphatic varix was the seat of acute inflammation characterized by the accumulation of polynuclear leucocytes in the distended vessels

and in the intervening tissue. The lymphatic vessels were filled in great part with blood, and had everywhere undergone thrombosis. Bacteriological examination demonstrated infection with diplococcus lanceolatus; secondary infection of the serous cavities in contact with the varix had occurred, and death resulted with acute fibrino-purulent inflammation of the peritoneum, right pleura, and both tunicæ vaginales.

Since the parasites in the preceding case were not studied during life, and were only observed in sections of the tissues obtained at autopsy, it was not possible to determine the details believed by Manson to distinguish different species of filaria. The sexually mature parasite discovered by Bancroft was described by Cobbold and given the name Filaria bancrofti. This nematode is known to be the parent form of the embryonic worms which Lewis had previously found in the blood. Filaria sanguinis hominis, the name originally proposed by Lewis and most commonly employed to designate filarial hæmatozoa, being trinomial, is not acceptable to zoölogists as a designation for the species. Manson,[1] who has carefully studied embryo filariæ from the blood of many individuals inhabiting widely separated tropical countries, has arrived at the conclusion that there are at least four, possibly five, distinct species of filaria, embryos of which circulate freely in the blood. His distinctions concern the disappearance of the parasite from the blood during certain periods of the day, its size, the presence or absence of an enveloping sheath, and certain details of shape and of structure.

Manson[2] discovered the remarkable fact that filariæ disappear from the blood during the day, though they may be found in large numbers during the night. Examinations repeated at intervals during the day and night demonstrate the periodic disappearance of the embryos from the cutaneous circulation. Appearing at six or seven o'clock in the evening, and gradually increasing in number, they reach a maximum at midnight. A gradual diminution in number then occurs, and at eight or nine o'clock in the morning they have entirely disappeared. Subsequent observers have confirmed the occurrence of this phenomenon. From an observation made upon an infected individual who committed suicide at 8.30 A.M., Manson[3] thinks it probable that the majority of the parasites accumulate during the day in the lungs. Stephen Mackenzie[4] made the important observation that this periodicity might be reversed by reversing the habits of the infected individual, causing him to sleep during the day and remain awake and take his meals during the night. Filarial embryos then become abundant during the day, but are absent from the cutaneous blood during the night.

[1] Lancet, 1891, vol. i. p. 4, and British Medical Journal, 1897, vol. ii. p. 1837.
[2] Transactions of the Pathological Society of London, 1881, vol. xxxii. p. 285.
[3] British Medical Journal, 1899, vol. ii. p. 644. [4] Loc. cit.

Manson subsequently found that the occurrence of this periodic disappearance of filariæ is not a constant phenomenon even when the habits of the infected individual undergo no purposeful change. In the great majority of cases, notably in individuals infected with various forms of lymphangiectasis, chyluria, and chylous hydrocele often demonstrably associated with the presence of the adult worm described by Bancroft in the infected lymphatics, the phenomenon of periodicity occurs, and to this parasite Manson has given the name Filaria sanguinis hominis nocturna, the prior binomial name being Filaria bancrofti. In the blood of three negroes from the west coast of Africa, Manson[1] found an embryo parasite which morphologically resembled the nocturnal form, but presented a reversed periodicity, appearing during the day, though absent during the night. Manson designates the parasite Filaria sanguinis hominis diurna. It is not inconceivable that some peculiarity of the infected individuals may have caused this alteration of the parasite. Manson's suggestion that Filaria loa is a parental form of this embryo has very little in its favor.

In natives of the west coast of Africa Manson found a third variety of hæmatozoa which does not disappear from the blood during either day or night, and has been designated by him Filaria sanguinis hominis perstans. It is much smaller than the previously mentioned parasites, possesses no sheath, is more actively motile, has a truncated tail, presents certain peculiarities of the oral apparatus, and does not possess the granular aggregation which in other forms has been found near the mid-part of the body.

In blood obtained from inhabitants of an island of the West Indies, St. Vincent, Manson[2] has described what he believes to be a fourth species, and has given it the name Filaria demarquayi. It has a pointed tail and is shaped like Filaria nocturna, but is less than half as large and has no sheath. It is present in the blood day and night. In the blood of aboriginal Indians from the interior of British Guiana he thinks that he has distinguished still a fifth variety. This was associated with a blunt-tailed embryo which he identified with his Filaria perstans of the west coast of Africa, the two being often found together on the same slide. This fifth variety, which he calls Filaria ozzardi, resembles very closely his Filaria demarquayi, and he thinks may be identical with it, though characterized by certain peculiarities of shape, size, and staining reaction which he does not clearly define. Galgey[3] found on the Island of St. Lucia what he believed to be Filaria demarquayi, and concluded that it was identical with specimens of Filaria ozzardi sent to him for comparison.

[1] Lancet, 1898, vol. i. p. 4.
[2] British Medical Journal, 1897, vol. ii. p. 1837.
[3] Loc. cit., 1899, vol. i. p. 145.

At the post-mortem examination of two British Guiana aborigines whose blood contained the two forms designated by Manson, Filaria perstans and Filaria ozzardi, Daniels[1] found in one case in the mesentery and in the fat at its base, in the other in the pericardial fat as well, male and female nematodes, which he believes are the parental forms of Filaria perstans. The uterus of the female contained only blunt-tailed embryos. The adult worm, which was more slender than Filaria bancrofti, and, unlike the latter, was provided with a slightly bulbous tail having a thickened cuticle prolonged into two triangular appendages. In a third case of similar character Daniels[2] found in addition to what he believed to be adult Filaria perstans a female and portion of a male located in the subperitoneal connective tissue of the anterior abdominal wall. The female closely resembled in size and shape Filaria bancrofti, but since the tail was slightly bulbous Daniels believed it to be a different species, the parent form of the blunt-tailed embryo, Manson's Filaria ozzardi.

The specific peculiarities of the filaria described evidently require further investigation. Periodic disappearance from the blood may be dependent upon peculiarities of the host. Male and female embryos of the same species may have slight morphological differences.

In the left ventricle of a child who died in Rio Janeiro, Magalhaes[3] found male and female sexually mature filariæ, of which he has given a careful description. They are much larger than Filaria bancrofti and differ in details of structure. The child's blood was not examined. From analogy it is not improbable that the parasite discharged embryo worms into the blood, but their relation to the forms which have been described by Manson is entirely unknown.

Filariæ were discovered by Demarquay in chylous hydrocele fluid. Wucherer found embryos in the urine of a case of tropical chyluria; Lewis, who first found filariæ in the blood, observed their frequent association with chyluria and with the so-called lymph scrotum, a condition in which the scrotum contains a mass of tortuous and dilated lymphatic vessels, the tunica vaginalis being often distended with serous or chylous fluid. Subsequent observations have demonstrated the association of filaria with various forms of lymphatic varix. These occur in a variety of situations—in the groin, in the axilla, and more deeply seated within the abdomen and thorax. Embryo filariæ are found both in the fluid from the varix and in the blood of the infected individual, while in a considerable number of cases (collected by Lothrop and Pratt) the adult worm has been found. When it has been possible, as in the present case, to determine the location of the

[1] Loc. cit., 1898, vol. i. p. 1011. [2] Loc. cit., 1899, vol. i. p. 1459.
[3] See von Linstow, Centralbl. f. Bakt., 1892, vol. xii. p. 88.

sexually mature parasite it has been found to occupy a dilated lymphatic vessel. The parasite associated with the above-named conditions has been identified as Filaria bancrofti, the embryos of which appear in the blood at night—Filaria sanguinis hominis nocturna of Manson. Though in the case herewith described it was not possible to determine the specific peculiarities of the filaria observed in sections of the hardened tissues, there is no reason to doubt its identity with that which has been found associated with the same lesion.

A very large proportion of those who harbor hæmatozoal filariæ are apparently in perfect health. Under what conditions the worm becomes harmful to its host is not understood. The embryos discharged by the female into the lymphatic vessels reach the blood presumably through the right or left thoracic duct, and, it appears, circulate freely without apparently producing any harmful effects. The various associated lesions have been referred to the presence of the adult worm in the lymphatics. Few autopsies have been performed on the subjects of filarial disease, and the pathology of chyluria, chylous hydrocele, ascites, and various forms of lymphatic varix, of the scrotum, of the groin, and of the axilla is not fully explained.

A case of filarial hæmatochyluria was carefully studied during life by Stephen Mackenzie,[1] and at autopsy there was found an enormous lymphatic varix, very closely resembling that of the above described case. A mass of dilated lymphatic sinuses, occupying the entire space between the kidneys, extended from the diaphragm to the bifurcation of the aorta, and was continuous below with lymphatic tissue lying upon the iliac arteries. The thoracic duct formed by the union of several dilated pouched channels arising from this mass was distended, and at a point one and a half inches above the diaphragm was filled by a loose clot. The terminal part of the duct appeared to be pervious. Finding the lymphatics near the kidney greatly dilated, Mackenzie thought it probable that within the kidney between the lymphatic and urinary apparatus there was a communication by which chylous lymph entered the urine. The bladder appeared to be normal. Chyle and blood had, however, entirely disappeared from the urine three months before death.

Much more decisive is a case reported by Havelburg.[2] The patient had for six months suffered with chyluria, and filariæ had been found in the urine and at night in the blood. A partial autopsy disclosed an immense abdominal tumor extending from the kidneys to the pelvis and composed of varicose projecting sinuses containing chyle. The tumor was in intimate contact with the left side of the bladder. On opening this organ there was found in the mucosa opposite a perforation from which milky fluid could be squeezed.

[1] Loc. cit.

[2] Virchow's Archiv, 1888, vol. lxxxix. p. 365.

Extensive lymphatic varices similar to those already cited are described by Manson,[1] Ewald,[2] and Young.[3] In Manson's case the terminal two or three inches of the thoracic duct were entirely occluded, but below this level the lumen was patent, though occupied by a firm thrombus. The patient of Young suffered with a lymphatic varix of the scrotum upon which two successful operations were performed. Projecting tumors of a similar nature were present in both groins. At autopsy a huge mass of dilated varicose lymphatics was found in front and on either side of the lumbar vertebræ, and extended into the pelvis behind the bladder. Prolongations extended into the scrotum and projected in the groins. The thoracic duct was greatly dilated, and, as Young believed, occluded only at its orifice. Filariæ had been repeatedly found during the night, and three adult filariæ were obtained from the varix of the left groin, while seven were present in the lymphatics of the right spermatic cord. The case resembles very closely that described in the present paper.

In the cases cited, lymphatic vessels within the abdomen in front of the vertebral column have been transformed into an immense varicose tumor. The thoracic duct continuous with this tumor mass has been greatly dilated, and in several instances its terminal part has been occluded. The presence of this lymphatic varix, from which extensions lie in contact with the wall of the bladder and pass through the inguinal canal into the scrotum and under Poupart's ligament into the groin, explains the clinical manifestations of filarial infection. The inguinal masses, Manson's so-called "varicose groin glands," formed part of an extensive varix and may readily be mistaken for femoral herniæ. A similar extension into the scrotum, associated perhaps with rupture of the thinned and dilated lymphatics into the tunica vaginalis, gives rise to the condition known as nævoid elephantiasis of the scrotum, lymph scrotum, or chylocele. The case of Havelburg seems to show that chyluria may be the result of actual rupture of dilated lymphatic vessels into the bladder.

Recorded cases of filarial varix do not afford a satisfactory explanation of its pathogenesis. Mackenzie, Manson, and Young regard occlusion of the thoracic duct as an essential factor in its production. Manson suggests that this may occur as the result of mechanical plugging by a bunch of intertwined parent filariæ, or, as a consequence of inflammatory changes, produced by the presence of filariæ in the lymphatic vessels. This explanation does not accord with a number of observed facts. Ligation of the thoracic duct in animals is not followed by the formation of lymphatic varices. In cases reported by

[1] Davidson's Hygiene and Diseases of Warm Climates, p. 814.
[2] Deutsch. klin. Wochenschr., 1888, p. 624.
[3] British Medical Journal, 1897, vol. i. p. 1037.

Martin,[1] Renvers,[2] and Ormered[3] the thoracic duct was occluded by thrombosis or by thrombosis and partial obliteration of the left innominate and subclavian veins. There were chylous ascites and moderate dilatation of the abdominal lymphatics, but nothing resembling the filarial varices described. On the other hand, in the cases described by Bryk[4] an extensive varicose condition of the abdominal lymphatics and of the lymphatics of the arms and legs as well was caused by a small tumor in the posterior mediastinum pressing upon the thoracic duct, but the condition did not resemble that which has been associated with filaria.

What part the right thoracic duct takes in the establishment of collateral circulation has not been shown. No dilatation of this channel has been noted in any of the cases mentioned.

A condition which has received little attention is well illustrated in the present case. The lymphatic vessels throughout the varix are filled not with lymph but with blood. The case of Mackenzie was one of hæmatochyluria. In Ewald's case the dilated lymphatics contained bluish-red clots. The suggestion of Manson that red blood-corpuscles are formed within the obstructed lymphatics is not supported by any evidence. The presence of blood within the dilated vessels suggests a regurgitation at some point of communication between the venous and lymphatic systems. Should the presence of adult filariæ bring about some change by which either temporary or permanent regurgitation might occur, the production of extensive varicosity would resemble that which follows a fistulous communication between an artery and a vein. It is very improbable that artificial communications between the vascular and lymphatic systems are ever produced by filariæ. It is not inconceivable, however, that the presence of the adult parasite might produce alterations of the valves at the orifice of the thoracic duct. The formation of a varix and the presence of blood throughout it are not explained by mere occlusion of the duct. The facts at our disposal do not furnish an adequate explanation of these conditions.

Repeated febrile attacks often associated with evident lymphangitis form an important clinical feature of filarial varix and its various manifestations. In the present case a fatal termination followed acute fibrino-purulent peritonitis and pleurisy, and the entire varix was the seat of acute lymphangitis. The left pleural cavity, which unlike the right was not in immediate contact with the varicose thoracic duct, escaped. Both tunicæ vaginales were the seat of fibrino-purulent inflammation resembling that of the peritoneum and pleura. Bacteriological examination demonstrated the presence of diplococcus lanceo-

[1] Cited by Dawson, Obstruction of the Thoracic Duct or its Venous Outlet. Twentieth Century Practice of Medicine, New York, 1895, vol. iv. p. 645.

[2] Loc. cit. [3] Loc. cit. [4] Loc. cit.

latus within the varix and upon the inflamed serous surfaces. The mass of dilated lymphatics not improbably represents a point of least resistance and exposes the infected individual to the constant danger of secondary bacterial invasion. The suggestion of Manson that death of the parent worm is a source of inflammation seems improbable.

The constant presence of a peculiar species of parasite and its relation to the associated lesion leave little doubt concerning the etiology of lymphatic varices and the accompanying conditions already considered. The relationship of filaria to the wide-spread tropical disease, endemic elephantiasis or elephantiasis Arabum, maintained by Manson and other writers, has not been so clearly established. In this disease repeated attacks of fever accompanying localized inflammatory œdema are followed by a progressive hypertrophy of the cutaneous and subcutaneous fibrous tissue and in less degree of the intermuscular areolar septa. The new-formed tissue is dense and fibrous and contains numerous distended lymphatic vessels. Some writers, for example Hebra,[1] in his monograph on elephantiasis, do not distinguish between true elephantiasis and hypertrophies due to the presence of lymphatic varices. So-called nævoid elephantiasis or lymphatic varix of the scrotum is, for reasons already discussed, doubtless caused by Filaria bancrofti. Manson summarizes as follows the facts which he believes show a causal relationship of the same parasite to true elephantiasis: (1) The geographical distribution of Filaria nocturna and elephantiasis Arabum correspond. (2) Filarial varix and elephantiasis frequently coexist in the same district and, indeed, in the same individual. (3) Lymphatic varix of the scrotum often terminates in elephantiasis, while (4) elephantiasis of the leg has been observed to follow removal of a scrotal varix. (5) Both lymphatic varix, which is undoubtedly caused by Filaria bancrofti (Filaria nocturna), and elephantiasis are diseases of the lymphatics and (6) are accompanied by the same type of recurrent lymphangitis.

Nevertheless, embryo filariæ are not necessarily found in the blood of those suffering with elephantiasis, and, indeed, Manson states, are less frequently present in the blood of such individuals than in unaffected natives of the same district. Manson has advanced the hypothesis that the lymphatics of the part are plugged by ova which have escaped from the parent worm before their complete development into slender worm-like embryos. This suggestion of filarial abortion, as he designates the process, is not supported by any direct evidence. He recognizes the fact that simple plugging of lymphatics is not sufficient to produce inflammatory hypertrophy of fibrous tissue, but thinks that recurring erysipelatoid inflammation in the congested area is an essential factor in the production of the disease.

[1] Wiener Klinik, 1885, vol. xi. p. 217.

Manson has suggested that the papular and pustular disease of the skin known as craw-craw occurring on the west coast of Africa is caused by the parasite which he designates Filaria sanguinis hominis perstans. Though O'Neil, who first described the condition, found a filaria-like worm in the pustules, the parasite has never been identified with any since discovered.

Manson found his Filaria sanguinis hominis perstans in three cases of "sleeping sickness" from the Congo, and suggested an etiological relationship. As he points out, the prevalence of filarial infection in the locality makes an accidental association of the two conditions not improbable in these cases. Filariæ doubtless cause various forms of lymphatic varix, chyluria, and chylous hydrocele, but their further pathological significance has not been established.

GRANULAR DEGENERATION OF THE ERYTHROCYTE.[1]

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Granular, basic, or punctate degeneration of the erythrocyte is a condition in which this cell presents fine or coarse granules that have an affinity for basic stains. This degeneration affects cells which show other evidences of pathological change, as poikilocytosis and polychromatophilia, or may be present in a cell which in all other appearances is normal. Further, it may be seen in nucleated erythrocytes, where it shows absolutely no relation to the nucleus. In size the granules may be so small that they can scarcely be seen, or so large as to be nearly the size of the eosinophile granule. The shape is usually rounded, though pear-shaped, and, exceptionally, rod forms are encountered. Cells may show one or the other sized granules, or a mixture of both. The granules are usually equally distributed throughout, or small clumps may be seen in different parts of the cell. This latter arrangement is especially marked in the early stages of experimental

[1] Read by Dr. Alfred Stengel at the Sixteenth Annual Meeting of the Association of American Physicians, held at Washington, D. C., April 30 to May 2, 1901.

productions and is rare in blood from the human subject. There may be a few large or fine granules scattered in the cell, or countless numbers densely packing the cell and to a great extent obscuring the intergranular substance.

It is impossible to detect this form of degeneration either in the fresh blood or in dried and unstained mounts.

Attention has been called to these granules as a special form of degeneration only in the past few years. Their presence in the circulating peripheral blood had been undoubtedly observed for a much longer period. The earlier writers, Geelmyden, Hausemann, V. Noorden, Loos, Askanazy, Shuman, Lazarus, Klein, Zenomi, and Lenoble observed such granules; and lately Litten, Krause, Bouchart, and Grawitz (in his first publications) called attention to cells with minute basic granules, which they thought were products of fragmentation (karyorrhexis) of the erythroblast, and, indeed, this view has not been wholly abandoned at the present date. Others have confounded them with polychromatophilic changes, and Plehn considered them related to malaria.

Grawitz, in his paper of September, 1899, was the first to lay particular stress on this granulated cell as an evidence of a special form of degeneration, and he opposed the earlier view of fragmentation or persistence of remnants of the nucleus, and pointed out that in his observations these cells were found in blood in which there was no other evidence of cellular change, and in which there were no nucleated erythrocytes; and, further, that when nucleated cells were present there were no transitional stages. Later, he demonstrated that this degeneration could be seen in nucleated cells while the nucleus was intact. In further studying the cells of the blood-forming organs he was unable to find this change in the newly-formed cells or in the erythroblasts, and, therefore, came to the conclusion that this degeneration was probably of peripheral origin, and he suggested that it was possibly due to the direct action of some blood poison. Litten substantiated this view in the study of the bone-marrow in cases of severe anæmias, where he found much evidence of erythrocytic degeneration, but was unable to find evidence of this special granulation. On the other hand, both Pappenheim and C. S. Engel have seen similar granules in embryonal blood. Hamel and Behrendt were the first to demonstrate the frequency of this cellular change in the peripheral blood of patients poisoned by lead. These observations gave Grawitz support for his former theories regarding their origin, and led him to study the blood under experimental intoxications with this metal. Experimentally he was able to observe these granulated cells in the blood of mice at a very early stage of the intoxication, and even when these animals had been subjected to the minute dose of 0.03 gramme of the acetate

of lead for a very short time. Moritz repeated similar experiments, using rabbits, and clearly demonstrated to his own mind that these granulations are an evidence of a true degeneration and not artefacts.

Sabrazès, Bourret, and Léger claim to have first produced these granules experimentally in animals, using guinea-pigs and injecting small doses intraperitoneally.

Grawitz, working upon a theory suggested by Plehn's observation of similar granulations in the blood of Europeans coming to the tropics, thought that the change of temperature had something to do with their formation. Following this idea, he was able to demonstrate the presence of these granules in mice subjected to increasing daily temperatures.

Schur and Loewy, in an extensive study of the bone-marrow in various diseased conditions, were unable to find such granulations. They came rather hastily to the conclusion, therefore, that this cellular condition was of artificial production.

From the foregoing observations and experimental studies it seems to us without a doubt that these granular formations, be they the remains of fragmentation of a previously existing nucleus or a special production, are an evidence of a pathological change when found in the circulation. With this in mind we have undertaken the study of this granular degeneration in lead workers and experimentally in its relations to lead intoxications. Our studies have included :

1. Cases of chronic lead-poisoning.
2. Studies in lead workers with no subjective symptoms.
3. Heat cases—heat workers and local therapeutical heat applications.
4. Results of experiments.

1. *The Cases of Chronic Lead Intoxication.* In all the cases so far reported by Hamel, Behrendt, Grawitz, Moritz, etc., in which the granules have been sought they have invariably been found. This granular formation seems to be a very early evidence of lead intoxication ; in fact, as will be seen later, appearing before all other symptoms, considered subjectively or objectively. The number of granular cells appears to be in direct proportion to the severity of the poisoning, and their disappearance is noted as the symptoms ameliorate.

Four of our cases were hospital cases, the men coming under observation with marked and typical symptoms of chronic poisoning. The granules were present in all four cases in varying numbers up to nine in one field (of a very thin spread and $\frac{1}{12}$ oil immersion). The granules varied in size, some cells showing very fine and others very coarse granules, and others a mixture of both. It might be said that in the severest cases the coarser granules are slightly in excess.

The blood otherwise showed only very slight changes from normal, namely, a slight paleness of the erythrocytes, and a slight poikilocy-

tosis, especially marked in irregularity of size. A very few nucleated erythrocytes were seen. These were normoblasts, and the majority of them showed the granular degeneration of their protoplasm while the nuclei were intact as far as could be detected.

2. *Lead Workers Without Subjective Symptoms.* Grawitz and Moritz each had five cases which could be included under this head, and in which they found granules. Examining twenty-one lead workers without subjective symptoms we found the granules present in every case. The spreads of blood were taken at the workshop while the men were actually engaged at their various duties. The nature of the work of these men included that of foreman of the works, "sprinklers" who watered the dust, and laborers, some handling the metallic lead, others the oxide, others the "wet pulp." These men were more or less exposed to the dust of lead during their working hours.

The list includes two who had worked only four days, the shortest exposure, and one man who had been constantly working in the metal for twenty-four years, the longest exposure. Only one of the twenty-one men, an oxide worker, had presented symptoms. This one had had several distinct attacks of chronic lead-poisoning in ten years of actual contact with the metal. One other, who had been working only three months, and who showed the greatest number of granules in the stained spread, had had about one month previous to observation an indefinite illness which had detained him one week from his work. The number of these granulated cells varied from a few in a spread to as many as two or three in a field of the microscope. The other evidences of blood changes were only slight and rather inconstant as to any particular form of variation. Twelve cases showed slight poikilocytosis, but more particularly irregularity in size of the corpuscles. Two at least certainly had deficient hæmoglobin (noted by the lack of stain taken by the cell). Three showed only a slight polychromatophilia, and in five cases normoblasts were observed, most of these latter cells showing granules in their protoplasm while the nucleus was unchanged. (See table at end of article.)

3. *Heat Cases.* The studies we made in this line were suggested by Grawitz's experiments with mice and by Plehn's observation on Europeans coming to the tropics, and by a case of an iron worker in whose blood we had found granulated cells in large numbers. They consisted in studying the blood of four iron workers who were subjected to intense heat while at their work at furnaces, and that of patients using local dry hot air treatment. In these latter cases, of which there were four, the various parts of the body, especially the limbs, were subjected to a temperature of 300° F. In the former as well as in the latter cases we were unable to find a single granulated cell in the spreads made from the peripheral circulation.

In the case above mentioned we were led to conclude that the granules were the result of the chronic diarrhœa which had existed for twenty years, or were possibly due to lead which he not unlikely received during a prolonged course of treatment. Here we might include five cases which had been subjected to applications of lead-water and laudanum. In two of these cases the application had been made to denuded areas, while in the remaining three to the unbroken skin. Daily observations were made in these cases for a week or ten days, but in them we were unable to find any evidence of granular degeneration.

4. *The Experimental Study.* These granules have been produced in mice by Grawitz, in rabbits by Moritz, and also in guinea-pigs and pigeons by Sabrazès, Bourret, and Léger.

In our own cases dogs were used, and the lead acetate was administered by mouth in capsules with the food. The initial dose was always a gramme, irrespective of the animal's weight. In two dogs one gramme was given daily throughout the observation; in three the initial dose of one gramme was increased by one gramme each day until the experiment was concluded. The blood in all these cases was carefully studied for several days previous to the experiment, and then every twenty-four hours for a few days after the intoxication had begun, and then at longer intervals. Spreads were made from the carefully shaven and cleaned ear, dried for twenty-four hours, and then fixed by heat, and studied under various stains.

Distinct granules appeared after the initial dose, usually in about three days, irrespective of the size of the dose compared to the animal's weight, or to the manner of increase of the same, though indistinct granules were noted after twenty-four hours. In the three cases in which the dose was rapidly increased the granules became more numerous in a shorter time than when the gramme dose was given daily. In all of these cases the early granules showed a greater tendency to cling together than they did later. This clinging together or clumping of the granules in different parts of the cell was more or less characteristic in these experimental productions. It was usually absent in the cases of lead-poisoning or of the lead workers. On the other hand, the even distribution so commonly seen in the lead workers was not observed at any stage of the experimentally produced poisonings. In the dogs it was a common observation to find associated with these granulated cells erythroblasts and polychromatophilia. The finding of these latter types of blood degeneration does not seem to us to be of such significance as when they are found in the human subject. They are a rather frequent finding in dogs which are used for experimental purposes. The appearance of granular degeneration in the peripheral blood, twenty-five hours after one of the writers had taken seven and one-half grains of lead acetate, shows conclusively the early production of this change in human blood.

The fact that these granules were not found in the bone-marrow by the various observers led us to believe with Grawitz that they were of peripheral origin, or that the usual methods for fixing the bone-marrow were inadequate for their demonstration. To determine the former view blood was taken from various veins of the body, stomach, mesentery, liver, portal vein, spleen, and heart in animals killed for this study, and compared with the blood taken ante-mortem from the ear. The results of these observations were as follows: The blood taken from the portal vein and splenic vein showed a greater number of these granules than did the blood of the ear, heart, or mesenteric vessels. This was but an isolated observation, and we hesitate to draw any definite conclusions. In five later cases this unequal distribution was not sufficiently marked to prove the peripheral origin of these granules.

For the study of the bone-marrow two methods were used. The bone was sectioned in pieces, three-quarters of an inch long, and the marrow was taken from its bony case by running an ordinary sewing needle around it, then, when it was freed from the bone, carefully pushing it out. In this way the marrow was obtained intact. Spreads were made from this marrow by the usual methods for making blood smears. Some of these spreads were fixed immediately in ether and absolute alcohol; absolute alcohol; 10 per cent. formol; saturated aqueous solution of bichloride of mercury; 1 per cent. osmic acid; saturated solution of picric acid in absolute alcohol; others were dried and fixed with heat alone, or previously to heating treated with ether to remove the fat. Further, this shelled-out bone-marrow was fixed by the usual methods and sections made from paraffin blocks. From the former spread specimens, variously fixed, we were able to demonstrate the granular changes in the erythrocytes and the erythroblasts, but in no bone-marrow spread was the number of these granules in greater number than we found in the peripheral circulation. These cells may have been in the circulation of the bone-marrow. The fixing agents from which the best results were obtained were ether and absolute alcohol, absolute alcohol, and bichloride solution. From the great amount of fat which is always present in these spreads, and which interferes to a great extent with fixing the specimens by the usual heat method, it was thought that it might interfere with the staining of these granules. To ascertain the rôle which fat played in this way spreads from the ear blood were kept at 52° C. for twenty-four hours on fat taken from the mesentery of a dog. They were then fixed by heat and stained in the usual way. While the granules could be found after the spreads were so treated there seemed a decrease in their number, especially so in the case of the finer granules.

From the bone-marrow fixed in the various methods and mounted in paraffin sections were cut at 2μ. In these sections fixed by various

agents—alcohol and ether; absolute alcohol; osmic acid, 1 per cent.; formol, 10 per cent.; Müller-formol; Zenker's solution; Flemming's fluid,—we were unable to demonstrate the presence of granules.

In our routine study of these granulated cells all the blood spreads have been fixed by heat on a copper plate. The specimens heated for a few minutes only seem to be better prepared for staining than those heated for a longer time. The stains used for this work have been the usual hæmatoxylin and eosin stains and thionin pheniqué. In using the former stains the specimens should be overstained with hæmatoxylin; with the latter the granulated cells stain rapidly and are very easily detected.

With aqueous solutions of the following stains we have been able to detect these granules in specimens fixed by heat: basic fuchsin, carbol-thionin, aniline green, gentian violet, Bismarck brown, tuloidin-blue, dahlia, methylene-blue; also Löffler's methylene-blue, hæmatoxylin, hæmalaum. We have been unable to find them when we used aqueous solutions of aniline blue, Berlin blue, Jod. green, indulin, tropæolin, blue-black, methylene-green, orange G., acid fuchsin, rosin, Ehrlich triacid, nile blue, benzopurpin. For routine work we recommend the use of the usual hæmatoxylin and eosin stains, or, which is especially good for the study of these granules, the thionin pheniqué, the formula of which is:

Thionin (French)	0.05
Carbolic acid	1.00
Alcohol 95 per cent.	10.00
Aq. destil.	90.00

The stain becomes better with age.

Our conclusions are:

1. The granules are a constant finding in cases of lead-poisoning, and appear very early in cases under the influence of lead salts long before subjective or other objective symptoms can be demonstrated.

2. The granules disappear in cases of chronic lead-poisoning as the convalescence is established.

3. Apparently lead does not produce an immunity, as one of the cases worked for twenty-four years, another for twenty years, without having pronounced symptoms of lead-poisoning, and in both of these cases the granules were present in moderate numbers.

4. The granules may be produced experimentally in dogs, appearing in a very few days after the beginning of the experiment, and increasing as the intoxication becomes severe.

5. The granules in the experimental cases are rather fine, and show a tendency to clump at first; later all varieties appear.

6. We believe these granules to be a true degeneration of the erythrocyte and having no relation to nuclear fragmentation or to polychromatophilia.

LEAD WORKERS.

Case No.	Time worked in lead.	Degree of exposure.	Poikilocytosis.	Hæmoglobin estimated by the amount of stain per cell.	Nucleated erythrocytes.	Granular degeneration.	Estimated average number of granular cells to a field ($^1/_{12}$ oil immersion).
1	7 years	Considerable.	Slight.	Normal.	Present (one in slide).	Present.	One to two cells to a field.
2	5 "	Moderate.	"	"	Absent.	"	One cell to every two or three fields
3	3½ "	Considerable.	"	"	Present (few).	"	One cell to every four or five fields.
4	24 "	Constant.	"	"	Absent.	"	One cell to every three or four fields.
5	7 "	Considerable; poisoning 5 yrs. ago.	Absent.	"	"	"	One cell to every ten or twelve fields.
6	9 "	Slight.	"	"	"	"	One cell to every ten or twelve fields.
7	11 "	Considerable.	Slight.	Reduced.	"	"	One cell to every ten or twelve fields.
8	9 "	"	Absent.	Normal.	"	"	One cell to every seven or eight fields.
9	7 "	"	"	"	"	"	One cell to every four or five fields.
10	2 wks	"	"	"	"	"	One cell to every six or seven fields.
11	6 "	Constant.	Slight.	Reduced, and polychromatophilia.	Present (many).	"	One cell to every six or seven fields.
12	8 mos.	"	"	"	Present (few).	"	One cell to every six or seven fields.
13	3 "	"	"	"	Present (many).	"	Two to three cells to every field.
14	4 days.	"	Absent.	Normal.	Absent.	"	One cell to every four or five fields.
15	4 "	"	"	"	"	"	One cell to every four or five fields.
16	5 years	Considerable.	Slight.	"	"	"	One cell to every field.
17	1 year	"	Absent.	"	"	"	One cell to every four or five fields.
18	2 wks.	"	"	"	"	"	One cell to every two or three fields.
19	4 "	Constant.	Slight.	"	"	"	One cell to every three or four fields.
20	20 years	Considerable.	Absent.	Reduced.	"	"	One cell to each field.
21	10 "	"	Slight.	Normal.	"	"	One cell to every three or four fields.

REPORT OF AN INTERESTING CASE OF ANEURISM OF THE INTERNAL CAROTID ARTERY.[1]

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THE case of dissecting aneurism of the internal carotid artery here presented is of interest, not only in consequence of its rarity and the peculiarity of the point of exit of the first hemorrhage, but also because

[1] Read at the Seventh Annual Meeting of the American Laryngological, Rhinological, and Otological Society, 1901.

of the diversity of opinion which existed among various competent observers regarding the etiology.

J. R., male, aged four years, born of Italian parents, was first visited March 15, 1900, in consultation with Drs. John H. Banta and M. Alexander Mackintosh, of Paterson, N. J.

The family history disclosed no specific tubercular or malignant disease except in the case of the maternal grandfather, who had been operated on for malignant disease of the tongue.

Previous History. The child has generally enjoyed good health; the left ear has discharged pus for over a year since the patient had an acute suppurative otitis. Ten days before the present date Dr. Banta first attended the patient, who at that time had an acute inflammation of the throat. There was a swelling in the left tonsillar region which was accompanied by fever, nausea, pain, and the general physical symptoms attendant upon peritonsillar inflammation.

On March 14th, in the afternoon, possible traumatism may have resulted, as an Italian woman, a midwife, called and, the father states, undertook to relieve the child by rupturing the tumor with the finger-nail. A little blood, and he thinks some matter, was discharged.

On the evening of the same day Dr. Banta was hastily summoned, as the child was bleeding from the ear; a very considerable hemorrhage occurred, lasting about fifteen minutes.

15*th*. An incision of the swollen mass in the tonsillar region was considered advisable, and preparation for the operation was made. The child was obstreperous while the physician was making a preliminary examination, and forcibly depressing the tongue a sudden gush of blood occurred from the left ear. The hemorrhage was very profuse and continued for over fifteen minutes, saturating six large towels. The writer was then called in consultation. *Examination.* The patient was pale and cold; skin dry, the pulse rapid and feeble, the expression anxious, and there was marked general depression. A blood-clot in the left auditory canal was removed. The inferior wall of the canal was apparently pushed upward in such a manner that no portion of the tympanum could be seen. There was a pulsation in the fluid on the line of coaptation of the canal walls. There was a tense, somewhat triangular swelling below the ear, about the size of an egg, which seemed to be limited by the fascia of the neck; no pulsation could be felt in any part of the growth, nor could any aneurismal bruit be heard.

Internally in the left tonsillar region there was a large tumor, dusky red in color, tense, and not easily compressible, which did not pulsate at any point. It involved the whole left peritonsillar region; extended downward toward the larynx and upward into the post-pharynx behind the left pillar of the fauces, and its most prominent portion pressed toward the right tonsil past the median line. Upon the anterior aspect of the tumor there was what appeared to be a dark-colored abrasion, about one-half inch in length, which was probably made by the finger-nail or by some instrument used on the preceding day by the Italian midwife. There was no hemorrhage from this point at the time of the examination. The tumor was diagnosed a "dissecting aneurism," and was thought to be due to possible ulceration of a bloodvessel from previous tonsillar disease or to traumatic injury at the hands of the Italian woman. Incision was opposed.

20*th.* Another considerable hemorrhage occurred from the left ear, and on the next day and for several successive days there was a constant discharge of bloody serum from the ear.

31*st.* The child was carefully examined. The swelling of the auditory canal had decreased; at the junction of the skin of the auditory canal and the tympanum were two points from which there was a discharge of a rather thick serous fluid; the tympanic membrane had a large perforation involving about one-third of its area. The tumor mass was much decreased in size externally and internally. The patient did not return for further treatment, having employed Dr. Vigna, an Italian physician.

June 11*th.* The patient was again referred to me on the advice of Dr. John C. McCoy, whom the attendant had called in consultation, as he wished to incise the tumor; incision was considered inadvisable. The patient was suffering from dyspnœa, and seemed drowsy and stupid. The tumor was increased very much in size. The doctor reported that the child had been fairly well until three days prior to present visit, when, during an attack of enteritis and fever, the tumor suddenly increased. A hemorrhage had probably occurred which dissected downward and encroached upon the laryngeal space.

The patient was referred to Dr. C. C. Rice for an opinion, which was in part as follows:

"I cannot at this date be positive as to the character of the tonsillar swelling, as to whether it is malignant or tubercular," and on a later date: "It looks as though the tonsillar growth is malignant. I hope you will have a tracheotomy done immediately."

The case was referred to in a discussion at a meeting of the Section on Ophthalmology and Otology, New York Academy of Medicine. An expression of opinion was asked regarding the probability of the aural hemorrhage resulting from an aneurism. Dr. H. Knapp at that time asserted that he believed it possible for a dissecting aneurism to burrow upward beneath the fascia of the neck and along the floor of the bony auditory canal, and for the blood to make its exit at the junction of the skin and tympanic membrane. Some of the members of the section seemed to lean toward the probability of a hemorrhagic otitis being the cause of the aural hemorrhage, inasmuch as the otitic inflammation was present as a complicating factor.

The case was examined by a number of surgeons, and the general opinion was that the tumor mass, which did not pulsate at any point, was not easily compressible, and over which no aneurismal bruit could be heard, should not be considered an aneurism.

13*th.* The child was sent to the Paterson General Hospital, etherized, and a tracheotomy made by the writer. The tonsil which was atrophied was dissected from the tumor mass and reserved for examination. The tumor walls were smooth and tense and dusky red. Two exploratory punctures were made in the tumor with an aspirating needle, one on the anterior surface and the other on the posterior. A

small quantity of blackish semi-disorganized blood was withdrawn. The report on the tonsillar mass sent to Dr. Thomas S. Cullen, of Baltimore, for examination was that in the atrophic tonsillar tissue "there is no evidence whatever of carcinoma, nor is there any suspicion of tuberculosis."

14*th*. The patient was resting comfortably, breathing nicely through the tracheal canula; stupidity and drowsiness disappeared. There was slight paralysis affecting the left eye. The pupil was moderately dilated.

25*th*. The tumor has decreased in size nearly one-half; the child breathes comfortably with tracheal canula corked; his general appearance is markedly improved; his appetite is very good, and the cachectic, waxy look has nearly passed away.

July 12*th*. The patient has steadily improved, is about the wards and looks very well. He is still wearing the tracheal tube. The left pupil is slightly dilated; the tumor mass much decreased in size; parents took him home for a short visit.

14*th*. Patient returned with a severe attack of bronchitis; coughed and expectorated through the tube large quantities of muco-pus.

29*th*. Patient had a second bronchial attack, after which there was a discharge of ichorous bad-smelling pus.

September 7*th*. Since last date, after recovery from bronchitis, the patient did well. The tumor gradually decreased in size, and it seemed possible that spontaneous cure would be effected. At 9.30 P.M. on this date the tumor mass suddenly increased in size; the child had a profuse hemorrhage from the nose lasting a few minutes. It subsided gradually, and the child slept quietly for about two hours, when he awoke coughing and bleeding from the mouth and both nostrils. In a very few minutes the bedding and mattress were saturated with blood, and large blood-clots formed beneath the edges of his pillow. The child lost considerably more than a quart of blood. When seen after this hemorrhage the patient was profoundly shocked, pale, cold, and apparently exsanguinated. He was restless and thirsty. His temperature was 99°, his pulse 160, and his respiration 36.

8*th*. The patient's condition was such that operation for ligation of the common carotid artery was not considered advisable. At 12.45 P.M. on the same day there was another very considerable hemorrhage.

10*th*. The patient died of exhaustion, no further hemorrhage having followed. Although no autopsy was permitted, there can be no question regarding the cause of death.

HYDATID DISEASE OF THE BREAST.*

By Robert G. Le Conte, M.D.,
of Philadelphia.

Scarcely an organ or any portion of the body seems to be exempt from hydatid disease, but one of the organs least frequently attacked is the breast. Owing to its extreme rarity, and perhaps also to the benign course which the disease runs in an organ so superficially situated, our

* Read at a meeting of the College of Physicians of Philadelphia, May 1, 1901.

text-books and systems of surgery touch but lightly on hydatid disease of the breast, and the subject, if referred to at all, is usually dismissed in a few lines. It therefore seems proper to place the following case on record, as it is apparently the first one to be observed in America, and at the same time to review the literature of the subject, in order that the prominent symptoms of the disease may be brought out clearly. In none of the reported cases was the diagnosis positively made previous to operation unless a spontaneous opening of the cyst had taken place.

Edna B., a well-nourished mulatto, aged twenty-seven years, was admitted to the Pennsylvania Hospital on March 13, 1899. She was born in Philadelphia, and has spent the whole of her life in this city or in the neighboring one of Camden. No clear history of the diseases of childhood is obtainable. Menstruation began at the age of fourteen, and was normal and regular. At sixteen years she was married, and later was the mother of two children, the first born at eighteen years and the second fifteen months later. At twenty-one she had a miscarriage. Shortly after the birth of the first child she noticed an enlargement, with pain, of the right cervical glands near the angle of the jaw; this enlargement slowly spread down the neck without suppuration. A little more than four years ago the right axillary glands also became prominent, with slight pain. Shortly after the axillary enlargement, say four years ago, she noticed a tumor the size of a chestnut in the right breast about two inches above the nipple; this tumor was hard, painless, not adherent to the skin, and freely movable. It preserved these characteristics for two years, during which time it did not increase perceptibly in size, until one day she struck it with the handle of a shovel while working. Rapid enlargement then began, and it was at times quite painful, particularly after a hard day's work. The tumor continued firm and hard until one month previous to admission, when it seemed to decrease a little in size and become soft. The right cervical glands suppurated and were incised six weeks before admission. On admission, a round, slightly tender, fluctuating tumor, the size of a small cocoanut, occupied the position of the right breast. The skin was normal in appearance and movable over the tumor, except for about an inch surrounding the nipple, where it was adherent, œdematous, and slightly inflamed. The growth could easily be moved over the pectoral muscle. But little breast tissue could be made out surrounding the growth. A small mass of tender and enlarged glands were felt in the right axilla. In addition there was a suppurating sinus on the right side of the neck, which looked tuberculous.

We have the following facts on which to base a diagnosis: A hard, painless, freely movable tumor in a young multiparous mulatto woman, appearing two years after a miscarriage and five years after a chronic enlargement of the right cervical glands. The tumor remained quiescent until subjected to a trauma, when it undergoes rapid growth, but still retains its hardness. The cervical glands break down and suppurate, followed by a softening of the tumor, adhesion to the skin in the region of the nipple, and fluctuation. Three conditions were considered: (1) Adenoma, which had undergone cystic change; (2) tuberculous abscess, and (3) echinococcus cyst. The latter was immediately dismissed on account of its extreme rarity and also because I knew

nothing of its clinical symptoms. As the cervical glands were so evidently the seat of tuberculous abscess, the possibility of the breast being the seat of a cold abscess was worthy of consideration. But this diagnosis was also dismissed on account of the long duration of the tumor (four years), its mode of growth, and the absence of sinus formation. A diagnosis was, therefore, made of adenocele or cystic adenoma, because adenoma is so common in young women, grows slowly and generally painlessly, causes atrophy of the gland from pressure, and sometimes attains large size, even to ten or twelve pounds in weight.

March 15th the patient was etherized and a curved incision made over the tumor to the outer side of the nipple. The sac immediately presented. In attempting to dissect this from the adhesions about the nipple the sac was ruptured and from twelve to fifteen ounces of pus escaped. Some of this fluid was immediately placed under a microscope and hydatid hooklets were found in large numbers. As scarcely any glandular tissue of the breast remained, the breast was amputated together with the enlarged axillary glands. The wound was readily closed with silkworm-gut sutures without drainage, and healed by primary union. The recovery was uneventful.

The pathological notes are kindly furnished by Dr. Simon Flexner:*

Wall of Cyst. The inner lining shows to the naked eye superficial convolutions which, on section of the cyst, present an appearance of polypoid excrescences. These are in immediate contact with the fibrous tissue in which there are islands of glandular tissue. Microscopically the excrescences described consist of a granulation tissue showing different degrees of density; the outward projections are lighter in texture than the intervening tissue where the cells are more compact. The character of the cells is largely epithelioid, but among these cells there are a certain number of the type of Unna's plasma cells. At the line of junction between the fibrous tissue and the granulations there is an almost unbroken layer of plasma cells. The inner surface shows an extensive hyaline transformation of the cells and the intercellular substance. Nothing that can be recognized as such remains of the cuticular membrane. In the forty or fifty sections examined hooklets were not discovered. In the adjacent mammary tissue there is an overgrowth of fibrous tissue.

Axillary Lymph Gland. Sections of a moderately enlarged lymph gland show (first) moderate hyperplasia of the lymph cords and (second) extensive hyaline degeneration of the cords and nodes. This latter degeneration affects the interstitial tissue, where it gradually obliterates the lymph cells proper. It also occurs in the walls of the medium-sized bloodvessels. It presents many of the appearances of amyloid degeneration, but it corresponds accurately with Recklinghausen's hyaline degeneration of lymphatic glands. There are no tubercles in the sections.

It is very difficult to get an estimate from the literature of the frequency of hydatid cyst compared with other tumors of the breast, or the frequency with which the breast is attacked in hydatid disease.

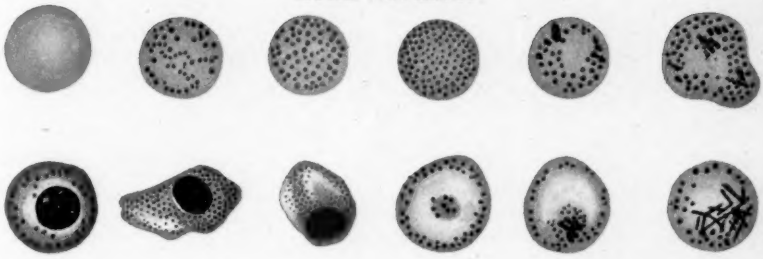
* The specimen was two years old when given to Dr. Flexner. The alcohol in which it was preserved had been repeatedly changed.

The eminent writers of the eighteenth and the first third of the nineteenth century classified most of the cystic diseases of the breast under the term of hydatid. Thus, Sir Astley Cooper, in his *Illustrations of Diseases of the Breast* (London, 1829), divides hydatid disease into four separate varieties, and in but one of these divisions does he speak of a parasitic origin. The report of such cases as true hydatids must, therefore, be looked upon with suspicion, unless some positive finding, as daughter cysts, scolices, or hooklets are recorded with the case. After a fairly careful search of the literature I have collected thirty-three cases in which the diagnosis of hydatid disease seems assured. In addition I append some cases where the echinococcus may have been present, but the history does not permit of an exact diagnosis. Of these thirty-three cases the histories are sufficiently clear in twenty-seven to draw some definite conclusions. I have arranged them in the form of a table under headings which seem characteristic of the disease.

Such cases as reported by Warren (*Surgical Observations on Tumors*, London, 1839, p. 205), Roux (*Notizen aus dem Gebiete der Natur- und Heilkunde*, 1828, Bd. xx., p. 351), Fréteau (*Journ. Général de Méd.*, Paris, 1828, p. 145), Sir Astley Cooper (*Illustrations of Diseases of the Breast*, London, 1829, Part I., pp. 49 and 50) are not placed in the table, because there is nothing in the history which shows them positively to be hydatids, although they have been so considered by other writers. The following cases were also omitted because the glandular tissue of the breast was not involved, the hydatid having its origin in the pectoral or serrate muscle, or within the cavity of the chest, although the tumor presented in the mammary region : Marmaduke Shield (*Diseases of the Breast*, London, 1898, p. 254) two cases, Gräfe and Walther (*Journ. de Chir. und Augen-Heilkunde*, 1827, Bd. x., Heft 3, p. 375), von Lesser (*Deutsch. med. Wochen.*, January 7, 1881, p. 7), Landau (*Arch. de Gynécologie*, 1875, t. viii., p. 350), Schnepp (*Rev. Centralb. f. Chir.*, May 13, 1876, p. 304), Gerdy (*Bull. de l'Acad. de Méd.*, 1844, t. x., p. 517), Gardner (*Lancet*, June 8, 1878, p. 851), etc. Many of these cases have been quoted as instances of hydatid disease of the breast. Guermonprez's (*Rev. Méd. Franc et Etrang*, Paris, 1884, p. 73) case, while quoted as a hydatid, was in reality a form of cysticercus. Dupuytren's case has been placed in the table, although the record does not clearly state the situation of the growth, whether in the breast or the pectoral muscle.

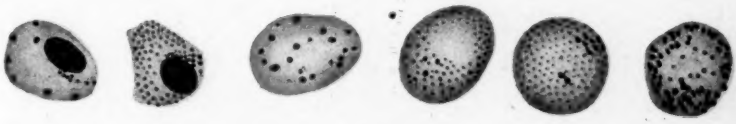
Recorder and reference number.	Marri'd or single.	Previous births.	Tumor.							Axillary enlargement.	Operation.	Remarks.
			First noticed	Duration.	Position.	Characteristics of growth.	Size.	Pain.	Contents.			
1. Bansi [1]	Single	None.	21 yrs.	2 yrs.	Left breast, lower inner quadrant.	Slow.	Egg.	For last few months	Clear fluid, one cyst.	None.	Incision and drainage.	Recovery 31 days; diagnosed as fibro-adenoma.
2. Bérard [2]	Marri'd	.....	.....	.....	Right breast, lower half.	Slow.	Twice as large as left breast.	Always present	Clear fluid, one cyst.	None.	Spontaneous opening.	Recovery 25 days; appeared 8 months after a blow on breast.
3. Bermond [3]	Marri'd	Preceding tumor.	26 yrs.	8 yrs.	Right breast.	Slow.	Apple.	None.	Clear fluid, one cyst.	None.	Punctured; later incision and seton	Recovery 3 months; had 6 labors; tumor appeared after fourth; also had abscess of the breast.
4. Birkett [4]	Marri'd	3 yrs.	23 yrs.	1 yr.	Right breast, inner half.	Slow.	Not stated.	Last 2 months	Pus, one cyst.	.....	Spontaneous opening.	
5. Birkett [4]	Marri'd	Not stated.	40 yrs.	11 yrs.	Right breast.	Not stated.	3 in. in circumference.	Last 3 years.	Clear fluid, one cyst.	.....	Amputation of breast.	Microscope showed echinococci.
6. Birkett [4]	Marri'd	While suckling child.	23 yrs.	6 yrs.	Right breast, upper outer quadrant.	Not stated.	4 in. in diameter.	Almost none.	Clear fluid, mother and daughter cysts.	.....	Excision.	Microscope showed hooklets.
7. Bryant [5]	Marri'd	3 yrs.	25 yrs.	5 yrs.	Left breast, upper half.	Slow.	Cocoanut.	None.	Clear fluid, mother and daughter cysts.	None.	Incision and drainage.	Recovery 3 weeks.
8. Astley Cooper [6]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Specimen in St. Thomas' Hospital, discharged by ulceration from an abscess of the breast.
9. De Haen [8]	.....	.....	.....	.....	.....	.....	Fist.	.....	Cloudy fluid, four cysts.	.....	Excision.	Diagnosed as scirrhus.
10. Dubourg [9]	Marri'd	3 yrs.	22 yrs.	4 yrs.	Right breast, lower inner quadrant.	Slow.	Mandarin.	None.	Clear fluid, mother and daughter cysts.	None.	Excision.	Tumor oblong, irregular, nodular.
11. Dubreuil [10]	.....	.....	42 yrs.	2 yrs.	Right breast, upper half.	Slow.	Fist.	Last 2 months	Pus, small hydatid cysts.	None.	Incision and drainage.	

Lead Workers.



Dog's Blood.

Lead Poisoning.



Bone Marrow.

STAINS.—Nos. I., II., and IV., Eosin and Hæmatoxylin. No. III., Thionin Phenique.

12. Dupuytren [11]	Marri'd	While suckling child.	28 yrs.	20 mos.	Left breast.	.....	Turkey egg.	Slight.	Clear fluid, daughter cysts.	.....	Incision and packing.	Position of growth vaguely described; may have been in pectoral muscle.
13. Finsen [12]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	States only that he has observed one case.
14. Fischer [13]	Single	.....	17 yrs.	4 yrs.	Right breast, upper outer quadrant.	Stationary 3 yrs.	Apple.	Last year.	Mother and daughter cysts.	None.	Excision.	Diagnosed as adenoma; digestive disturbances previous to appearance of tumor.
15. Franceschi [14]	Marri'd	Three confinements.	23 yrs.	2 yrs.	Left breast, central.	Slow.	2 by 4 inches.	Occasional.	Clear fluid, hooklets.	None.	Excision.	Tumor irregular and lobulated.
16. Franceschi [14]	Marri'd	Following miscarriage.	21 yrs.	18 mos.	Right breast, upper outer quadrant.	Slow.	Turkey egg.	None.	Clear fluid.	Slight.	Excision.	Tumor hard and nodular; pathological examination showed characteristics of hydatid cyst.
17. Graham [15]	Marri'd	Preceding tumor.	.....	7 yrs.	Right breast, upper outer quadrant.	Grew only during lactations.	Not stated.	Last few days.	Clear fluid, hooklets.	Present.	Incision.	Tumor appeared after fifth labor; four labors since; grew only during last three lactations.
18. Henry [17]	Marri'd	.....	23 yrs.	5 yrs.	Left breast, lower inner quadrant.	Stationary 3 yrs.	Orange.	Last 2 years.	Cloudy fluid, mother and daughter cysts.	Present	Excision.	Recovery 27 days; suffered from tapeworm in childhood.
19. Höppener [18]	Marri'd	.....	35 yrs.	6 yrs.	Left breast, upper outer quadrant.	Stationary 5 yrs.	Fist.	Last 6 months	Pus, mother and daughter cysts.	None.	Spontaneous opening; later incision.	Intestinal catarrh for 3 years previous to appearance of tumor.
20. Jonassen [1]	Single	.....	.....	.....	Left breast.	.....	Egg.	.....	One cyst with scolices and hooklets.	.....	Excision.	Tumor of several years' duration; patient aged 34 years.
21. Lauenstein [19]	Marri'd	.....	37 yrs.	11 yrs.	Right breast, upper half.	Stationary 8 yrs.	Not to be cov'd with hand.	None.	Fluid and seventy daughter cysts.	.....	Incision	Recovery 9 weeks; married 28 years; mother of 9 children.
22. Le Conte	Marri'd	Miscarriage 2 yrs.	23 yrs.	4 yrs.	Right breast, 2 inches above nipple.	Stationary 2 yrs.	Cocoanut.	Occasional during last 2 years.	Pus containing hooklets.	Present.	Amputation with removal of axillary glands.	Rapid growth follow'd a traumatism.

Recorder and reference number.	Marri'd or single.	Previous births.	Tumor.							Axillary enlargement.	Operation.	Remarks.
			First noticed	Duration.	Position.	Characteristics of growth.	Size.	Pain.	Contents.			
23. Le Dentu [20]	.....	.....	37 yrs.	2 yrs.	Right breast, outer half.	Slow.	Small billiard ball.	None.	Mother cyst.	Present.	Excision.	Diagnosed as carcinoma.
24. Lenzi [21]	Marri'd	.....	25 yrs.	18 mos.	Right breast.	Slow.	Egg.	Slight.	Clear fluid and scolices	.....	Excision.	Said to have followed a blow.
25. MacGillivray [22]	.....	.....	23 yrs.	4 yrs.	Right breast, upper inner quadrant.	Stationary some months	Egg.	.....	Pus and putty material.	.....	Puncture followed by excision.	
26. MacGillivray [22]	.....	.....	38 yrs.	6 yrs.	.....	Stationary long time.	Large.	.....	Mother and daughter cysts.	None.	Excision.	Tumor hard and lobulated.
27. Malgaigne [23]	Marri'd	4 yrs.	36 yrs.	6 yrs.	Left breast, lower inner quadrant.	Stationary 1 year.	Pigeon egg.	None.	Straw fluid, mother cyst.	None.	Partial excision.	Nearly healed in one week.
28. Michaelis [24]	.....	.....	.....	.....	Left breast.	.....	.....	.....	Cyst size of pigeon egg.	.....	Excision.	Diagnosed as scirrhus; patient aged 21 years.
29. Moutet [25]	Marri'd	.....	.....	.....	.....	.....	Large.	.....	Hydatids found.	.....	Incision.	
30. Schmidt [26]	Marri'd	21 mos.	42 yrs.	21 yrs.	Right breast, upper outer quadrant.	Stationary 14 yrs.	Two fists.	Last few years.	Clear fluid, mother and daughter cysts.	Present.	Spontaneous opening; later excision.	Recovery 23 days.
31. Symonds [28]	.....	.....	28 yrs.	2 yrs.	Right breast, upper half.	.....	3 in. in circumference.	.....	Clear fluid.	.....	Excision.	Daughter cysts or hooklets not found.
32. Toca [30]	Single	.....	19 yrs.	2 yrs.	Left breast, upper outer quadrant.	Slow.	Apple.	Last year.	Clear fluid, mother and daughter cysts	.....	Incision followed by suppuration	Recovery 73 days.
33. White [32]	Marri'd	Not stated.	56 yrs.	4 yrs.	Right breast, upper outer quadrant.	Slow.	Walnut	Constant.	Pus, one cyst.	.....	Incision.	Recovery 4 weeks; also hydatid cyst in left arm below insertion of deltoid muscle.

Statistics. In the United States and Canada, Osler, up to 1891, collected 85 cases of hydatid disease, and Alfred Mann has since added 24 more, making a total of 109 cases. In none of these was the hydatid disease in the breast. In Europe, Davaine, up to 1877, gives a critical analysis of 253 cases, and does not mention one of the breast. Madelung collected in Mecklenburg 196 cases, of which 91 were women, with none in the breast. Cobbald's 136 cases show one in the breast. Böckmann during ten years at the Berlin Charité collected 33 cases, 14 of which were women, with none in the breast. Finsen, in Iceland, up to 1869, saw 253 cases, 181 of these being women, with one in the breast. In some combined statistics of Europe, including cases collected by Neisser, Davaine, Finsen, Cobbald, etc., over 1800 cases were represented, and probably 12 or 15 would be a fair representation of the number in which the breast was involved. In Australia, Thomas, up to 1884, collected 1417 single and multiple hydatid cysts, three of which were in the breast, but in 541 the situation of the cyst is not mentioned. Thomas has also tabulated 1897 cases, drawn from European, Australian, American, and Indian sources; 20 of these cases were in the mamma, a percentage of 1.054. Such a percentage seems to me entirely too high, for in combined statistics many doubtful cases creep in which it is impossible for the collector to verify. Without any figures to substantiate it, I believe that 1 per cent. will fairly represent mammary involvement in women, between the age of puberty and the period of the climacteric, who are suffering from hydatid disease. When we compare hydatid cyst with other tumors of the breast the fraction becomes so small as to be insignificant.

Sex. The condition is confined to women, as there is no record of a case in a male breast.

Age. The age of the woman at the time the tumor was first noticed varies from seventeen years to forty-two years, with one exception. In this case, reported by White, the woman was fifty-six years of age when she first noticed the growth, but White does not mention whether menstruation was still present or not. No cases in childhood are recorded. We may, therefore, say that the disease begins only after puberty and probably before the climacteric; in other words, during the child-bearing period.

Single and Married. Of the four single women in the table, the ages of three are noted, respectively, seventeen, nineteen, and twenty-one, the age of highest development of the breast in the single woman. Of the 18 married women previous pregnancies are spoken of in 11, and in 7 no mention is made of the subject. In these 11 cases the tumor was noticed four times immediately after confinement or a miscarriage, the period when the breast is at its highest physiological development. In the other 7 cases pregnancy is noted in 2 two years previously, in 3

three years previously, and in 1 four years previously. In 1 the woman had three pregnancies, but the date of the confinements are not stated. We may, therefore, conclude that the parasite finds a lodgement in the mamma only when that organ is richly supplied with blood.

Breast and Position of Tumor. In 18 cases the right breast was involved, in 10 the left, and in 5 it is not mentioned. The position the growth first occupied is mentioned in 22 cases—8 upper outer quadrant, 1 upper inner quadrant, 4 lower inner quadrant, 4 upper half, 2 lower half, 1 outer half, 1 inner half, and in 1 the position is noted as central under the nipple. There is nothing particularly significant about the breast involved or the portion of the organ where the parasite develops, although the upper half seems to be involved twice as frequently as the lower, and the right breast almost twice as often as the left.

Characteristics of the Tumor. In all cases the tumor was first noticed as a small, hard, movable lump, not adherent to the skin or to the pectoral muscle Pain was conspicuous by its absence, and even tenderness was seldom spoken of. In many cases the hardness of the tumor was especially referred to. The mode of growth is rather characteristic. In 13 cases the tumor, more or less continuously, slowly increased in size; in the other 10 cases periods of time were noticed in which no perceptible growth occurred. These periods varied from several months to eight and even fourteen years. In two or three cases traumatism was attributed as the cause of the tumor, and in several the previously noted tumor took on a rapid growth after traumatism. In one case two lactations followed the appearance of the cyst; during the first the tumor remained quiescent, but the second seemed to induce a rapid growth. In but one case—White's—were the cysts multiple, one in the right breast and one in the left arm below the insertion of the deltoid muscle. The tumor was usually noted as round or oval, with a smooth surface, but in four it is spoken of as nodular or lobulated, and of irregular outline. Pain was seldom spoken of except in the later stages, and was associated principally with the period of rapid growth. It was these two symptoms—pain and the rapid increase in size—which caused most of the patients to consult a physician. Adherence to the skin or underlying pectoral fascia occurred only in the later stages of the tumor and seemed to be a precursor of ulceration with a spontaneous opening. In one case, beside adherence to the skin, there was retraction of the nipple. Enlargement of the axillary glands was noted in 6 cases; in 1, however, the enlargement antedated the tumor; in 12 it was noted as absent, and in the remainder it is not mentioned. In no case was fluctuation detected in the growth until it had reached a large size, and even then in some cases the cyst wall was so thick and tense as to give the impression of a solid growth. Crepitation, or hydatid

thrill, which is sometimes elicited in echinococcus cyst of other organs, was never noted. Erythema, or urticaria of the skin, the so-called hydatid rash, which has appeared several times after aspiration of a cyst of the liver, has never been seen after aspiration or puncture of a hydatid of the breast. As the cyst increased in size the glandular tissue of the breast atrophied, probably from pressure, so that when the tumor was very large but little breast tissue could be recognized around it.

Degeneration and Death of the Hydatid. As in other situations of the body, hydatid cyst of the breast is prone to undergo degeneration. When the cyst is large, say from the size of an egg to its largest extent, suppuration is apt to occur in the cyst. The apparent causes for this change may be a traumatism or applications of stimulating or irritating ointments. When suppuration occurs adhesion of the cyst wall to the skin rapidly follows, with later ulceration and formation of one or more sinuses. In this way daughter cysts have been observed escaping from what was termed an abscess of the breast. In five of the cases recorded a spontaneous opening of this character occurred, with a discharge of pus and hydatid débris. Under such circumstances the disease will tend to cure itself without surgical interference, although the convalescence may be a very slow one. There is also another mode of death to which the hydatid is liable without the rupture of the cyst wall. As Thomas has pointed out, cases are not rarely encountered in the post-mortem room where hydatid cysts have solid contents resembling putty in appearance, instead of the usual watery fluid. The microscope shows this putty-like material to consist of fat and granular débris, carbonate and phosphate of lime, cholesterine, hooklets, and broken-down hydatid membrane and scolices. The causes which lead to such a death of the parasite are probably numerous. First. The animal may have reached its natural term of existence, in which case decay and death would follow as a sequence. Second. The production of daughter cysts may be so numerous as to destroy the mother cyst by pressure. Cases are on record in which collapsed daughter cysts were so closely packed as to resemble the dried raisins of commerce. Third. The growth of the hydatid may be much more rapid than the outer or surrounding fibrous sac. This relative disproportion of growth causes the endocyst to become doubled and involuted on itself, and the fluid which the parasite should contain is replaced by the membrane of the animal; a time will soon come, then, when the food-supply is no longer sufficient to support the life of the animal. Fourth. The outer fibrous sac, like all similar connective tissue growths, tends with advancing age to contract and become more dense, diminishing the calibre of its vessels and interfering with the circulation in its substance, thereby producing degenerative changes which later lead to the formation of calcareous plates. As a result of this degeneration,

the supply of nourishment to the endocyst is gradually reduced until the animal dies. Of all these probable causes of the death of the parasite the most important perhaps is the condition of the fibrous sac. In one case reported by MacGillivray a cyst the size of an egg was found filled with this putty-like material. In the breast, then, we have examples of both forms of spontaneous cure of the disease recorded. Whenever the contents of a hydatid has altered from a clear fluid, degenerative changes are said to have begun, no matter how slight the opalescence or cloudiness may be. The variations from a slightly turbid fluid to pus or putty material is one only of degree, and they are related as a beginning decay is to a complete one. Of the 24 cases in which the fluid contents of the cyst was noted 16 are reported as clear and 8 as showing some degenerative change in the organism. It may, therefore, be stated that hydatid cysts of the breasts are prone to degenerative changes.

It will be remembered that in four of the cases the tumor was spoken of as nodular or lobulated and of irregular outline. In an organ so superficially situated as the mamma it might be expected that the cyst would invariably present a uniformly smooth and rounded appearance, especially as the underlying muscle and chest wall would be the only point of resistance. May not this nodular appearance be explained by the degenerative processes which take place in the fibrous capsule? These degenerative thickenings and calcareous changes in the sac are never uniform, but vary greatly in different portions of the capsule. If, as they are proceeding, the animal within is also undergoing vigorous growth, the thinner portions of the capsule would stretch and bulge, producing an irregular or nodular contour. The lobulated appearance would simply mean, then, that degenerative changes had begun in the fibrous capsule, and if these changes persisted the nutrition of the parasites would be interfered with and ultimately lead to the death of the organism. We may, therefore, consider the nodular shape as the beginning of a spontaneous cure of the disease.

SUMMARY. Hydatid disease of the breast occurs only in women from the age of puberty to the climacteric. It is characterized by the appearance of a small, hard, painless tumor situated in any portion of the glandular tissue of the breast, freely movable with the surrounding breast tissue, either growing slowly or with a more or less long period of inaction. The firmness of the tumor continues until it attains considerable size, and even then the characteristics of a cyst are seldom present. For the most part the growth is smooth and of round or oval shape. Enlargement of the axillary glands, severe pain, irregular outline, and adhesion to the skin are characteristic of inflammation outside of the sac, or degenerative changes in the sac wall, leading ultimately to the death of the organism and a spontaneous cure, either

through ulceration or encapsulation. Pain is also associated with rapid growth.

DIAGNOSIS. Owing to the great rarity of the condition, the diagnosis previous to operation or spontaneous opening will always be an extremely difficult one. In the young it will naturally be mistaken for adenoma; in the old, when adherence to the skin and axillary enlargement have taken place, a malignant growth will seem probable. It will scarcely be profitable to discuss the various diseases which it may simulate. The diagnosis can alone be positively made with the exploring needle and the microscope.

TREATMENT. Although the growth has a tendency to limit itself with a spontaneous cure of the disease, it would never be wise to wait for such a condition to occur, or to attempt to bring it about by the application of irritant or escharotic drugs. Such applications were frequently made a century ago when the dread of the knife and its consequences were feared. Nor should aspiration be used except as a means of making a diagnosis. The treatment should always be operative, and may be divided under four headings, according to the conditions present:

1. When the cyst is young and not very adherent to the surrounding breast tissue, dissect it out and close the wound without drainage.

2. When the cyst is old and larger and so intimately connected to the breast that excision would involve a considerable mutilation of the glandular tissue of the mamma, incise the growth freely and evacuate its contents, and then pack or drain, so that granulation may take place from the bottom.

3. When the cyst is quite large, thick-walled, and firmly adherent, but is still surrounded by a considerable portion of the breast tissue, make a partial amputation of the breast.

4. When the cyst is so large that most of the breast tissue has disappeared through atrophy, or when the nipple is involved and adherent to the growth, a complete amputation of the breast should be done.

No death has been recorded in hydatid disease of the breast, not even when suppuration has persisted for months after a spontaneous opening. In other portions of the body hydatid cysts have proved fatal from prolonged suppuration, either from exhaustion or from amyloid changes.

MODE OF ENTRANCE OF THE PARASITE. It has been suggested, notably by Dennis, that the parasite may gain access to the gland in the same manner that the streptococci and staphylococci do in abscess of the breast—*i. e.*, through the nipple.* Dr. Dougan Bird has accounted for the remarkable frequency of lung hydatids in Australia on the ground that the ovum is inhaled and starts its growth directly in

* It has never been proved that bacteria can enter the breast through the nipple, for in abscess of the breast an abrasion of the skin will be found if looked for.

some part of the air passages. According to our present views neither of these hypotheses can be correct, for it seems necessary that the eggs must enter the stomach in order that their envelope may be digested by the gastric juice and the enclosed embryo set free. I cannot do better than quote from Thomas the causes that influence the seat of hydatids in the body: "It may naturally be supposed that the liver becomes the most frequent seat of these cysts, because the embryos, after finding their way into the portal vein, here meet with the first obstruction to their passage through the capillary system; but many do find passage through it, and, travelling through the inferior vena cava, enter successively the right auricle and ventricle of the heart, and thence by the pulmonary artery reach the pulmonary capillaries, where again a considerable number abide; others run the gauntlet of this second obstruction, and pass by the pulmonary veins into the left side of the heart, and subsequently become conveyed by the current of the systemic circulation to the most remote and varied parts of the body of their host." Such a theory will coincide perfectly with a majority of the cases of hydatid of the breast. If the woman is unmarried we observed the embryo find lodgement in the mamma only when the blood-supply to the gland is at its maximum—namely, shortly after puberty. If it be a married woman, the time of lactation or shortly after it seems to be the chosen moment, when the gland is physiologically in its highest state of development and requiring its maximum of blood. But, as Thomas remarks, it is probable that so simple and mechanical an explanation does not convey the whole truth, for every cystic tapeworm has certain chosen seats in its host, although the echinococcus seems to enjoy the widest distribution of any of the parasites.

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A CONTRIBUTION TO THE PATHOLOGICAL ANATOMY OF SPORADIC CRETINISM.[1]

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and

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of Philadelphia.

In the latter part of 1897, Mr. S., of Reading, Pa., consulted one of us (Packard) because of hepatic insufficiency. In obtaining the routine history of this case it was found that one of his children, aged six years, was idiotic and undeveloped. Further questioning confirmed the opinion at first formed, that this might be a case of cretinism. He was urged to bring his child to the city, where it could be properly placed upon thyroid treatment. Accordingly, the child was admitted to the Children's Hospital on December 7, 1897. Nothing in the family history had any bearing upon the case. Two other children, born respectively before and after this child, were perfectly healthy. Although he was not weighed at birth, the subject of the paper seemed to be of normal size and development. He was breast-fed until he was twenty months old. At four weeks of age, while in his mother's arms, he had some sort of an attack in which he seemed to lose all power in the body and had complete arrest of respiration. He was taken to the fresh air, and soon revived. From this time it was noticed that his tongue protruded constantly from his mouth, and after this attack until he was two years old he cried almost constantly, sleeping only at intervals of a half hour's duration. It was noted that he grew very slowly, but at no time was it observed that he had distinctly ceased to grow. He was weaned at the age of twenty months, and was then fed on water crackers, soft-boiled eggs, and milk until three years of age, when he was given ordinary children's diet. For his whole life he has been intensely constipated, his bowels never moving more than three times a week. From the age of three to five years he never had a bowel movement without the use of a soap-and-water enema. During the early part of the period last mentioned he had obstinate constipation for ten days in spite of efforts applied both by the mouth and the rectum.

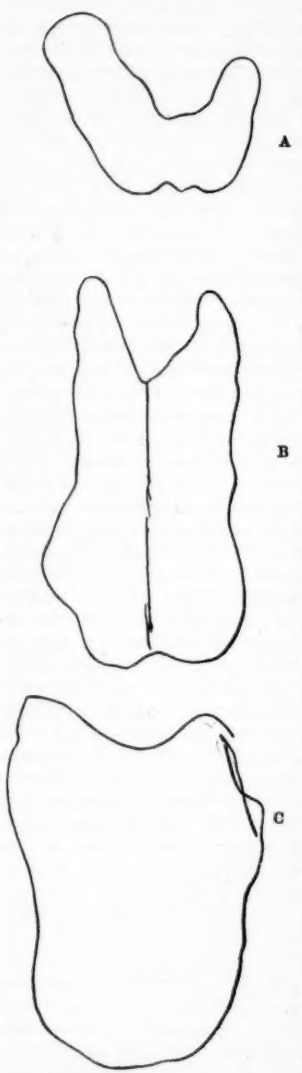
When admitted, although six years of age, he measured only 81 cm. He was unable to talk, and understood nothing but a few words, and

[1] Read at the meeting of the American Pediatric Society, May 26, 1901.

those only when spoken with a certain tone of voice. He lay back among the pillows, perfectly apathetic, and not moving except for an occasional slight rolling of the head. The skin was of a peculiar yellowish-white color, and the mucous membranes were quite red. The features were heavy and doughy, the eyes half-closed with thick lids. The nares were widely opened, the alæ being decidedly thickened. The tongue was held constantly protruding from the mouth, and measured 4 cm. in width and 1½ cm. in thickness, completely filling the orifice of the lips, and being very doughy to the touch. He had a full set of temporary teeth, but they were stunted, wide apart, and most of them plainly decayed. The lips were very thick, the angles of the mouth rounded. The pupils were equal and natural, the eyelashes well developed. The scalp was almost completely devoid of hair, and had over it in places thick, oily, yellowish crusts. The anterior fontanelle was widely open and pulsating. The ears appeared of a size proportionate to the rest of the body. The circumference of the head was 50 cm., the neck was very large and full, and at the base was surrounded with a thick collar of doughy consistence, measuring 32 cm. in circumference. The whole appearance of the face was distinctly porcine and devoid of expression. The tissues of the upper extremity were very thick and heavy, especially in the forearms, which felt as though they were the seat of solid œdema. The hands were pudgy and short, and the skin of the hands curiously wrinkled. The trunk had a curious shape, owing to the huge development of the soft parts, and the small relative size of the hips. The chest was round, much expanded at the base, and the costosternal angle formed almost a straight line. Owing to the thickness of the neck the condition of the thyroid gland could not be made out, although it was not apparently enlarged. Careful examination of the lungs, heart, liver, and spleen showed no abnormality. The abdomen was very aldermanic, and there was a quite large umbilical hernia. The spine was straight except in the lumbar and lower dorsal regions, where there was distinct bowing. The genitalia were well developed, both testicles descended, and the prepuce was rather long. The lower extremities showed distinct bowing, with great rolls of tissue at the normal flexures. The feet were noted to have the same curious wrinkled appearance that was present in the hands. It was soon found that while he could take solids fairly well it was impossible for him to swallow liquids. His weight on admission was twenty-seven pounds eleven ounces. Four days after admission he was placed on two grains of thyroid extract three times daily. This was continued until January 2d, at which time he had lost in weight three pounds and thirteen ounces. Even as early as nine days after admission decided improvement was noted, and he was found in a feeble way attempting to amuse the children in the ward by throwing things on the floor. By December 23d it was noticed that the tongue was less constantly protruded, that he frequently smiled and looked around the ward, and that he was able to take fluids much better than on admission. By December 28th, three weeks after admission, his skin was becoming wrinkled and the collar of fat was rapidly disappearing. On January 2d the dose of thyroid extract was diminished, owing to an apparent weak attack which he had had on that morning. One grain was given three times daily from January 2d until January 16th. On the latter date he weighed twenty-two pounds two ounces, a loss of five pounds

nine ounces in the five weeks since his admission. During this period he steadily improved as regards his general appearance, while his mental condition had showed a manifest change. On January 12th he was found to measure 2½ cm. more in length than he did on admission, about one month before. On January 16th the dose of thyroid was decreased to one-half grain, and on the 19th it was reduced to one-quarter of a grain three times daily. On January 22d he weighed twenty-one pounds four ounces. the lowest weight recorded up to that time. Owing to his seeming rather weak the dose of thyroid gland was diminished to one-quarter of a grain daily from January 29th to February 10th. On the 20th of the latter month his length was 85 cm., a growth of 4 cm. since his admission. His weight was twenty-one pounds eight ounces, or six pounds and three ounces less than on admission. With his improvement in other directions his bowels also showed a greater tendency to move naturally. He was kept on the thyroid extract in doses of one-quarter of a grain two or three times daily until April 14th, when he was taken back to his home. When he left the hospital, in the middle of April, he had ceased losing weight, was bright and active, took an interest in his surroundings, recognized his favorite nurses, cried when he considered himself slighted, and in every way acted quite naturally. He showed himself to be of a very affectionate disposition, and recognized with pleasure the return of his parents, whom he had not seen for some months. While he was at his home he seemed to gain even more as regards his mental power. He there played with the other children, learned to feed himself, and gained about two pounds in weight. He was brought back to the hospital on May 6th, and was found to weigh twenty-five pounds. On his return to the hospital he seemed to recognize the nurse who had taken care of him before, and, as nearly as could be told, remembered his surroundings. On his admission he was again put on the extract of thyroid in doses of one-quarter of a grain three times daily. His weight on re-admission was twenty four pounds. The thyroid extract was continued, but he was sent to the country branch, where he gained in weight, apparently from his more healthy surroundings in the fresh air. He remained in the hospital on this occasion until July 26th, when he was discharged, looking very different than on his first admission. He was readmitted to the hospital on October 20, 1898. While at home he had been doing very well, treatment being continued. He was learning to talk, was constantly creeping about, and trying to stand with the help of a chair, and certainly understood much that was said to him. During his stay at home he gained over six pounds in weight. His length had increased between the date of his first admission, December 7, 1897, and the date of his re-admission, October 20, 1898, to the extent of 9 cm. Re-examination on his last admission showed that the general appearance had decidedly improved; that the hair was well grown; that the anterior fontanelle was almost entirely closed, and that the tongue was kept constantly within the mouth. The abdomen was very much less distended, and the relative sizes of the chest, abdomen, and pelvis were much nearer normal. He stood quite well when given slight support, he laughed quite naturally and merrily, and in place of the feeble whine or grunt with which he expressed displeasure on his first admission the cry of anger or of grief was quite natural. He was again put on thyroid extract in doses of from one-quarter to one-half grain three times

Fig. 1.



Actual length and breadth of thyroid and thymus glands.

A. Thyroid body.
B. Cervical portion of thymus.
C. Mediastinal portion of thymus.

daily, and this was followed by some loss of weight. Except for this, however, no material change occurred, until on November 5th he developed elevation of temperature, dry cough, abdominal distention, and coated tongue. The temperature gradually rose until it reached a range of from 104° to 105.5°, with occasional elevations even beyond that point. From the very onset of this acute attack he rapidly emaciated, became intensely adynamic, and died on November 12th, one week after the onset of his acute illness. During the whole course of this attack it seemed as though the resisting power was almost *nil*, and from the very outset it was evident that his illness was almost certain to terminate fatally.

Autopsy was performed three hours after death. Rigor mortis was present. There were dark purple ecchymoses, mainly over the left shoulder and upper arm, over both knees, and over the left tibia. Subcutaneous fat was well marked. The lungs were normal. Directly below the thyroid cartilage there was a body resembling the thyroid gland in external appearance, with a narrow constriction in the centre and two wings which nearly encircled the trachea, the right lobe being the larger. From the lower part of the body a vein ran directly downward into the left innominate. Below this evident thyroid body there were two tips of glandular substance in the position of the lower part of the normally placed thyroid gland. These bodies extended into the neck 1½ cm., and were the extension of a large mass of glandular tissue situated in the anterior mediastinum. The cervical part was composed of two lobes held by connective tissue. They showed on microscopical examination the typical structure of thymus gland. In the anterior mediastinum was another large mass, which also was composed of normal thymus tissue. The bronchial glands were not enlarged. The spleen was firm, pale red, and rather dry. The liver reached to the costal margin and had the appearance of being fatty.

The kidneys were lobulated, the cortex pale, and with marked stellate injection of the veins. The intestines showed on the peritoneal surface areas of congestion. In their lumen there was a small amount of yellowish-green fecal matter. From the jejunum down Peyer's patches were elevated and red, while some were distinctly ulcerated. Throughout the ileum there was wide-spread and intense folliculitis. The œsophagus showed injection of the mucous surface which felt like very fine sand-paper. The stomach was normal, as were also the pancreas and the suprarenals. In the superior longitudinal sinus of the brain there was a yellow thrombus. Nothing important was noted in the brain, except for the fact that the hypophysis measured 13x7x5 mm., which was considered abnormally large for a child of this size and age.

Microscopical Examination. Thyroid Gland. The alveoli are distinctly marked off by bands of white fibrous tissue, which is in greatest amount around the bloodvessels. The epithelial cells are abundant, showing considerable variation in size. The acini are small, many contain no colloid substance whatever, and in those in which the colloid is present it is in very small masses, the total amount in the section being scarcely more than that in two or three acini of a normal thyroid. Equally striking with the deficiency in colloid is the presence in the walls of the larger bloodvessels, especially the veins around the gland, of a decided calcareous change. This involves especially the media, with the formation of cavities surrounded by the calcareous deposit; in some places the process has extended to the adventitia and the intima, but in none of the sections was there visible a rupture of any of these "atheromatous abscesses" into the lumen of the bloodvessels. (Figs. 2 and 3.)

Thymus. Both the upper and lower bodies of the thymus were normal, the cells staining well.

The changes in the other organs were such as could be attributed not to the cretinism, but to the febrile infection, which resulted fatally.

Hypophysis. The acini are distinct and the glandular epithelium is abundant; the fibrous layer is scanty; the posterior lobe resembles the anterior.

Aorta. Normal; no sign of calcareous change.

Skin from Abdominal Wall. The horny layer is very thin; the rete mucosum is normal in appearance. In the papillæ of the cutis vera there is a wide-spread infiltration of lymphoid cells, which in the corium show a tendency to form aggregations. The nuclei of the corium are numerous and stain well. The fibres of connective tissue of the corium are all very coarse, those near the papillæ being slightly finer. The elastic fibres are few in number. In the deeper layers of the corium there is decided infiltration of lymphoid cells around the ducts of the sweat glands.

Liver. There is a universal fatty degeneration of the parenchyma with large areas in which the outlines of the cells are indistinct and the nuclei are imperfect. Distinct areas of focal necrosis are not made out, which would point to another than a typhoid infection.

Spleen. All of the nuclei stain poorly, and the cells are separated by a granular material.

Kidneys. There is a marked degeneration of the parenchyma throughout all the tubules.

Heart Muscle. There is a very slight cloudy swelling.

FIG. 2.

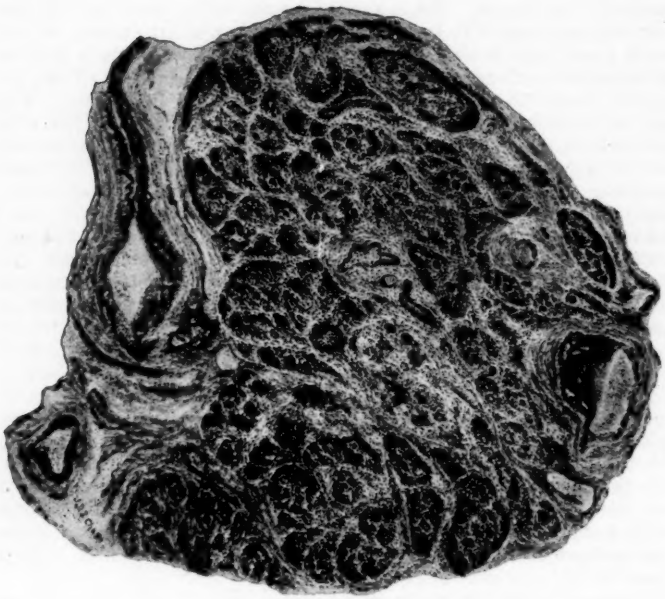


FIG. 3.

Thyroid gland from a normally developed child of nine years.

Suprarenals. The nuclei do not stain well. The layer of pigmented cells is not distinct.

Two or three points in this case seem to us to be worthy of more than passing mention. These we consider to be the rapid improvement under the use of the specific drug, thyroid extract; the extremely rapid malignant course of his infection, typhoid fever; the presence of enlargement of the pituitary body; the great increase in the size of the thymus gland; the presence of the thyroid gland, and the extensive disease of this, with calcification of the walls of the arteries going to it. In addition to this the intensity of the lesions produced by the typhoid toxin, and especially the necrobiotic changes occurring in the liver, are worthy of mention, because of their possible bearing upon the question of the resisting power of cretins treated by thyroid extract.

The rapid improvement in the mental and physical condition under treatment with thyroid gland is so ordinary an occurrence as to require no extensive consideration. We can find in the literature but few facts bearing upon the relative resisting power to infections possessed by the cretin as contrasted with the normal human being. In the *Lancet* of December 10, 1898, Byram Bramwell particularly remarks upon the fact that a female cretin, aged thirty-six years, "had never had any of the diseases peculiar to childhood, though she had been exposed to some of them. She had slept, for example, in a room with one of her sisters who was suffering from scarlet fever during the whole course of the disease, but did not take it." Among the reports that we have read there is no other evidence of any peculiar immunity presented by the cretin. One case mentioned by Osler,[1] occurring in the Indiana School for Feeble-minded Children, died from acute tuberculosis. This case had been under treatment with thyroid extract from September, 1895, until its illness in March, 1896. It is difficult to estimate to what extent and in what manner the resisting power of the cretin to disease in general is affected by diminishing the cretinoid condition through the administration of thyroid gland. In our case it seemed as though the resisting power was very slight, and from the very onset the child rapidly lost flesh and strength, became intensely adynamic, and died at the end of the first week from asthenia—a termination of typhoid seldom seen in childhood.

Nicholson[2] reports a case treated with thyroid extract from October, 1894, to July, 1895, with marked improvement. In the middle of the latter month the child "contracted measles of a most malignant type, and died on July 16th, after three days' illness." Nicholson states that a sister died of the same disease at the same time, and that apparently

[1] American Journal of the Medical Sciences, October, 1897.
[2] Archives of Pediatrics, June, 1900.

the treatment of the condition of cretinism did not render the child more susceptible or less resisting. We have been unable to find a sufficient number of cases thoroughly reported from which to draw conclusions as to the resisting power of cretins treated or untreated. Bourneville and Bricon[1] mentioned one cretin who passed successfully through attacks of erysipelas, and quoted a case of Charpentier's dying from erysipelas, and one of Ball's dying from "albuminuria with typhoid symptoms."

So far as we can find, the first mention of enlargement of the hypophysis occurring in a cretin was reported by Boyce and Beadles.[2] In this case the cretin was nine years old, and growth had been arrested at the end of the first year. No trace of the thyroid was found, but the pituitary body was enlarged, so that it measured 1 cm. by 6.5 mm. (the measurement of the cut accompanying their article). In an autopsy upon a cretin well-known among Philadelphia men, who for years was a patient in the neurological ward of the Philadelphia Hospital, the autopsy, at which one of us (Packard) had the opportunity of being present, showed that while the thyroid gland was absent the pituitary body was not enlarged. In almost all of the fatal cases of sporadic cretinism the thyroid gland has been shown to be entirely absent. In the case of Bartine, briefly mentioned above, a careful search was made for this organ, and its complete absence was thoroughly demonstrated.

In forty-four cases of marked sporadic cretinism tabulated by Byram Bramwell[3] fourteen were fatal. In ten of these the condition of the thyroid gland was noted. In all but one of these ten there was no trace of thyroid gland remaining. Among Osler's cases, collected in 1897,[4] he narrates the case of a cretin, aged fourteen years, dying at the Indiana School for Feeble-minded Children. This child had been treated with thyroid extract with marked improvement, but died of acute tuberculosis about a year after treatment was instituted. The thyroid gland weighed four grammes, as contrasted with the normal weight of fifteen to twenty grammes. Careful study of this thyroid gland, made by Dr. Barker, agrees in some respects very closely with the examination of the thyroid gland from our case. The enlargement of the pituitary body in the case which we report has not been very frequently noted. In addition to the case of Boyce and Beadles, mentioned above, where this gland was enlarged, we find one mentioned by Comte, quoted from Burckhardt,[5] wherein the sella turcica was said to be very large, and the hypophysis hard, reddish, and of the size of a bean, its weight when fresh being 0.36 gramme. Microscopically it

[1] Archives de Neurologie, September, 1886.
[2] Journal of Pathology and Bacteriology, 1893.
[3] Atlas of Clin. Med., vol. i. p. 17.
[4] Transactions of the Congress of American Physicians and Surgeons, vol. iv. p. 169.
[5] Ziegler's Beiträge, 1898, Bd. xxiii. p. 104.

was found that it contained a large amount of colloid material both in the interior of the gland and in the canal, with small masses of colloid material within the acini. It also showed very many vessels filled with blood. In regard to the relative weight of this gland in his case, he compares it to two others from patients aged five and six years (his case being three years), who weighed 0.180 and 0.315 respectively, as contrasted with the weight of 0.360 in his case. Comte mentions the examination of the hypophysis made by himself in the case of a cretin dying two days after birth, in which the hypophysis weighed 0.123 gramme, and showed that the posterior or the nervous portion was composed, not of the ordinary nervous tissue of other hypophyses, but of the same form of tissue as composed the anterior lobe. In his case, also, the hypophysis was very vascular without excess of colloid material. The thyroid gland was present and weighed in the fresh state twenty-two grammes; microscopically it appeared to be very vascular and contained but a very small quantity of colloid substance. Particular mention is made of these few facts in regard to the hypophysis in cretinism since the observations of Rogowitsch, which seemed to show a compensatory action of the pituitary body in cases of experimental removal of the thyroid gland in animals.

A point which seems to us of more interest than any in connection with this case is the calcareous infiltration of the walls of the blood-vessels of the thyroid body. While we have been unable to make as thorough an examination into the literature of the subject as we could have wished, we have failed to come across any mention of such a change observed by others. Its significance cannot be definitely asserted, but the observation is of some interest because of the supposed relation between various diseases connected with the thyroid gland and the drinking water. We have written to many of the physicians in the town from which this boy came, but have but few replies in answer to our inquiries regarding the frequency of goitre, myxœdema, and cretinism in that locality. One surgeon with a large practice has written to us that he constantly has two or three cases of goitre under his care. His answer has been so recently received that we have not been able to obtain more exact particulars from him. Although an unscientific opinion, it may be mentioned that the father of this boy states that he knows two cases similar to his son's among people living in his immediate neighborhood. He has endeavored to persuade them to have their child placed under proper treatment, but without avail. This statement, of course, should not have much weight, but the family likeness of cretinism is so close and the appearance is so characteristic that a lay diagnosis of one painfully familiar with the picture might be received with consideration.

PSEUDOMEMBRANOUS INFLAMMATION OF THE MUCOUS MEMBRANES CAUSED BY THE PNEUMOCOCCUS.*

REVIEW OF THE LITERATURE AND REPORT OF A CASE OF PNEUMOCOCCIC PSEUDOMEMBRANOUS EXUDATION ON THE MUCOUS MEMBRANES OF THE MOUTH, TONGUE, THROAT, NOSE, EYES, GLANS PENIS, ANUS, ETC., COMPLICATING ACUTE LOBAR PNEUMONIA.

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AND

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The case here reported is remarkable in one respect only, *i. e.*, the occurrence, during the course of an attack of acute lobar pneumonia in a boy of eleven years, of a profuse pseudomembranous exudation upon nearly all the mucous surfaces of the body open to inspection, caused by the pneumococcus (diplococcus pneumoniæ). In addition to the visible fibrinous exudate upon the mucous membranes exposed to view, the case also showed signs of extensive adhesive pleuritis and marked and continued tympanites, with the passage of membranous shreds in the stools, leading to the belief that the fibrinous process involved also the pleuræ and the gastro-intestinal tract. Aside from these features the case showed nothing remarkable, pursuing a severe and protracted course which terminated by gradual lysis with recovery. The case will, therefore, be reported chiefly with reference to the unusual complications, omitting unimportant details relating to the more usual features of the disease—from the clinical side by Cary, who had charge of the case throughout, and from the pathological side by Lyon, who saw the case for the first time on January 17th in consultation with Cary—as follows:

Summary of case: Acute lobar pneumonia of both bases, with development during the first ten days of a profuse pseudomembranous exudate, first upon the tonsils and quickly extending to the mucous membranes of the lips, tongue, mouth, palate, throat, and nose, and transferred to the eyes, glans penis, and anus; physical signs of fibrinous pleuritis; marked and persistent tympanites; membranous shreds and mucus in the stools. Microscopical examination: bacillus diphtheriæ, streptococcus, saccharomyces albicans, etc., absent; diplococcus pneumoniæ present in abundance in the sputum and in the exudate from all locations, grown in cultures and injected into a rabbit and recovered from the organs and blood after death. Diagnosis: pneumococcic infection resulting in acute pneumonia, pleurisy,

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and fibrinous exudation upon the mucous membranes.—T. R., aged eleven years, a boy somewhat undersized and undeveloped for his age, of the best social condition and surroundings, was taken ill on January 5, 1901.

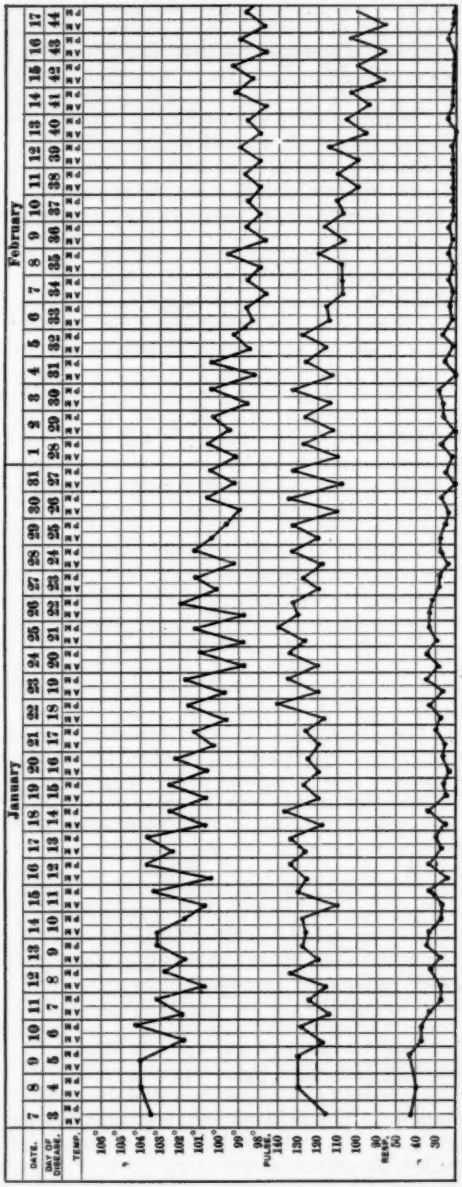
Family History. Negative.

Personal History. The patient has had the usual diseases of childhood. He had been a mouth-breather from enlarged tonsils, which were excised five years ago, since which he has been subject to frequent and severe attacks of follicular tonsillitis, of which as many as eight or nine sometimes occurred during a single season. Throat cultures made during these attacks always proved negative for the diphtheria bacillus. During the past year only a single attack of tonsillitis occurred. One year ago he had a short, slight attack of catarrhal pneumonia, from which he recovered without incident.

Present Illness. The present illness began on January 5, 1901, with sore-throat and fever, which were supposed by the boy's mother to indicate the onset of one of his accustomed attacks of tonsillitis, and he was treated with the usual remedies. On January 7th the family physician, Dr. Cary, was called, and found a reddened sore-throat (without exudation), signs indicating early involvement of the base of the left lung, and temperature 103.5° F., pulse 114, and respirations 42. Next day the temperature was 104° F., pulse 130, respirations 40, and the signs of pneumonia at the left base were more marked. On January 11th signs of consolidation of the right base also appeared, and the patient complained of a painful sore-throat. Examination showed an abundant white exudate covering both tonsils, from which a culture was made and was reported negative for the diphtheria bacillus by Dr. Thomas B. Carpenter, bacteriologist of the City Board of Health. In the meantime a marked vesicular eruption had appeared over the chest, following directly the application of turpentine and oil (1 : 6). The vesicles were numerous, discrete, and reached the size of a five-cent piece in some instances, and the sores left by them were an annoying feature in the early part of the illness.

On January 12th a herpetic eruption appeared upon the lips; the exudation was more or less general throughout the mouth and throat, and the eyes were the seat of a beginning conjunctivitis. Dr. H. Y. Grant, oculist, was placed in charge of the eyes, and active treatment was directed to them. On January 13th there was marked fibrinous conjunctivitis, and subconjunctival hemorrhages were scattered over the eyes, the lids were swollen and adherent, and photophobia was complained of. The mucous membranes covering the lips, gums, cheeks, margin and under surface of the tongue, hard and soft palate, fauces, tonsils, pharynx (as far back as could be seen), and nose were covered with a continuous, white, adherent exudate, which could be torn off in shreds and pieces, sometimes as large as a twenty-five-cent piece, leaving behind a raw, granular, bleeding surface. The boy could not be restrained entirely from picking at his nose and lips, and his fingers were seen to be bloodstained. He thus apparently transplanted the infection from one place to another.

On the evening of January 15th the glans penis (circumcised) became involved in the same membranous process, and next day was covered in its greater part by a thick, raised, adherent membrane, which extended to the meatus and caused the lips to be glued together, producing difficulty in micturition by pressure. The process did not, however,


January
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extend into the urethra. The membrane could be torn off in pieces, leaving behind a raw bleeding base similar to that seen in the mouth after removal of the exudate.

At this time a large piece of the membrane obtained from the mouth was submitted to Dr. Herbert D. Pease, bacteriologist to the New York State Pathological Laboratory of the University of Buffalo, who reported negatively for the diphtheria bacillus, but noted the presence of frequent diplococci, the nature of which, however, was undetermined, as the examination was somewhat cursory.

Next day, January 16th, an examination showed the anus also involved in a membranous deposit, and the nurse first noted the presence of membranous shreds in the stools. The deposit on the anus extended within the sphincter, though to what distance was not determined, as a speculum could not be introduced without much pain. A shred about two inches long was removed through the anus by winding it upon a match. For several days the abdomen had been distended with marked tympanites. The stools had been rather frequent, soft, contained considerable mucus, and much gas was expelled. The spleen was not palpable, and no rose spots appeared.

At this time the disease was at its height. Both lower lobes were consolidated. The membranous exudate was profuse and showed no signs of yielding to active local treatment. The breathing was noisy and labored, with seeming suffocation from the accumulation of mucus in the upper air passages. The expectoration, which was mostly swallowed, was thick, viscid, mucopurulent. The cough was constant, deep, and gagging. About this time, also, signs of extensive fibrinous pleuritis became marked, chiefly over the left base; the right base was also involved, but not so frankly. The pleural friction over the left base could be felt with the hand on the chest, as well as heard with the stethoscope. The patient's condition seemed critical.

On January 17th the case was first seen by Dr. Lyon in consultation with Dr. Cary, when the disease was at its height, and the following examinations were made by him:

Blood. Leucocytes, 16,600; hæmoglobin, 70 per cent. Differential leucocyte count: neutrophiles, 81 per cent.; small lymphocytes, 12 per cent.; large lymphocytes, 6.5 per cent.; eosinophiles, 0.5 per cent.; 400 counted. Red corpuscles well formed; an occasional normoblast. Fibrin increased. Widal test negative.

Sputa. Mucopurulent, yellowish-white in color, with an occasional reddish streak. Microscopically the sputa showed numerous pus cells, epithelial cells, sometimes containing brown granules (blood detritus), mucus, and fibrin; occasional red blood-corpuscles; a few very small fibrinous casts of the finer tubules with dendritic processes attached. Stained specimens showed numerous large diplococci, with wide capsules, morphologically identical with the diplococcus pneumoniæ. This organism stained by Gram, but the capsule was not clearly stained by Welch's method.

Membranous Exudate from Lips. Thick, white, gelatinous material, which was partly soluble in water, which latter gave the chemical reactions for mucin. The undissolved residue showed typical fibrin filaments and stained by Weigert's method. Stained specimens showed in abundance the same diplococci as found in the sputa, as well as an occasional single coccus. Numerous epithelial cells and leucocytes and

much detritus were also found in the exudate. The *diphtheria bacillus, streptococcus, saccharomyces albicans, etc., absent.*

Membranous Exudate from Nose, Glans Penis, and Anus. All of these specimens were similar grossly and microscopically to the pseudomembrane from the mouth, all containing the same encapsulated diplococcus in large numbers, practically in pure culture, except the membrane from the anus, which showed, in addition to the diplococcus, contamination with the usual fecal flora. [It is worthy of note that in the case of the glans penis the exudate was not deposited upon a true mucous membrane, as was the case in all the other locations, for the boy had been circumcised in early childhood.]

Exudate from Conjunctivæ. This was flaky, and did not take the form of a uniform membranous deposit, as in the other locations involved. The same organism was found (pure) as in the other specimens, though less numerously, probably due to the active and continued treatment which the eyes had received (frequent irrigation, etc.).

Feces. Nothing characteristic was found except the same diplococci found elsewhere. The single specimen examined contained much mucus, but no fibrinous shreds.

Cultures. Pure cultures of the pneumococcus were obtained from the exudate from the eyes and nose, and mixed cultures of the pneumococcus and the staphylococcus pyogenes aureus from the membrane from the mouth and from the sputa. The diplococcus did not grow upon potato, and did not liquefy gelatin. It grew upon blood-serum, agar, glycerin-agar, and bouillon. It coagulated litmus milk, with the production of an acid reaction.

Inoculation. One minim of a suspension of the nasal exudate in normal saline solution was injected into the peritoneal cavity of a rabbit, which died in twenty-two hours with general peritonitis and septicæmia. The pneumococcus was obtained in pure culture from the heart's blood, organs, and peritoneal exudate. Stained smears from the heart's blood showed the pneumococcus typically in pairs, occasionally in short chains, with a wide capsule surrounding.

Urine. Several urinalyses were made by Dr. G. A. Himmelsbach, showing a trace of albumin, without casts, and the general characteristics of an acute febrile urine.

The eyes were practically clear and free from the exudate by January 28th. The mouth, throat, nose, and anus at this time showed improvement, but the exudate was still present in these locations in considerable amount. The membrane on the glans penis was less resistant and tended to dry up and disappear after a few days with active treatment. Gradually, after another week or ten days, the deposit over the other locations disappeared, after persisting for about four weeks in spite of active local treatment with various antiseptics. The tympanites lasted about two weeks and was a prominent feature of the disease.

The termination of the pneumonic process was by gradual lysis, as shown by the accompanying chart. The boy was allowed to sit up for the first time about the middle of February, and convalesced slowly. Slight dulness with pleural crepitation persisted over the left base, and was present when the boy was last examined, April 20, 1901.

Little remains to be said of this case after the recitation of the facts. That the production of a pseudomembranous exudate upon the various

mucous membranes was caused by a specific local action of the pneumococcus cannot be doubted in view of the bacteriological findings. That the pneumococcus is capable of causing such lesions is attested by the reports of various observers. This case appears to be unique, however, in the wide extent of the process. Not only were involved nearly all the mucous membranes of the body that could be inspected, but probably the gastro-intestinal tract as well, as evidenced by the prolonged tympanites and the passage of membranous shreds and mucus in the stools. No other reported case has shown such a wide distribution. It is noteworthy also that the process was not entirely confined to the true mucous membranes, as the glans penis had been circumcised in early childhood. The infection seemed to have been transplanted from one place to another by the boy's fingers, which were bloodstained from picking at his nose and lips. The pleuræ of both sides were apparently involved in an extensive fibrinous pleuritis, and small fibrinous casts of the finer tubules were found in the sputa. All of these phenomena occurred as complications in the course of acute lobar pneumonia. There were fortunately no signs of endocarditis or pericarditis.

As but few cases of pneumococcic pseudomembranous inflammation of the mucous membranes are recorded in the literature, and most of these are of recent date, it will probably add to the interest and instruction of our case to briefly review the cases that we have been able to collect from the literature by a rather diligent search. Most of the text-books of medicine make no reference to such a process. The cases may be divided as those occurring in association with pneumonia and those occurring as a purely local infection independent of a pneumonic process, as follows:

Cases of Pseudomembranous Inflammation of Mucous Membranes Occurring in Association with Pneumonia. This class includes (*a*) cases in which the pneumococcic origin of the croupous exudate upon the mucous membranes was not proved, but merely suggested by its association with pneumonia, and (*b*) cases in which the pneumococcus was shown by bacteriological methods to be the specific agent in producing the lesion.

(*a*) *Pneumococcus not Found.* The earliest reference to croupous inflammation of mucous membranes as a complication of pneumonia that we have found is the statement by Bristowe,[1] in 1879, that "sometimes membranous patches on the mucous surface of the large intestine" occurred in acute pneumonia.

Osler[2] was the next (1885) to point out the same condition, reporting five cases of "croupous colitis" in one hundred autopsies on subjects dead of pneumonia. The process was represented usually by a "thin, flaky exudation involving only the surface of the mucous membrane. In none of the cases was there ulceration." "In one case (Case III.)

the cæcum was covered with a thin layer of adherent lymph, and scattered throughout the colon and sigmoid flexure there were numerous elevated patches of lymph, about the size and shape of rupia-crusts, which on section were found firmly attached to the mucosa. In this instance the process was very extensive, and the patches were thicker than in any subsequent case." In another case in this series of one hundred autopsies (Case IV.) "the stomach and duodenum were found greatly distended with gas. The mucosa was pale, except about the fundus, where, just to the left of the cardia, there was an extensive area of croupous inflammation, represented by a thick, adherent, grayish-white exudate, covering an area 12 by 8 cm. Beneath the mucosa the membrane was deeply injected."

Massalongo[3] is also credited with having reported a case of pseudomembranous enteritis as a complication of pneumonia.

Bardon[4] reported the case of a man, aged twenty-four years, who developed in the stage of resolution of pneumonia a pseudomembranous angina involving the entire pharynx.

(*b*) *Pneumococcus Found.* Weichselbaum[5] mentions briefly a case of lobar pneumonia and pleurisy with croupous enteritis. The pneumococcus was found in the intestinal croupous exudate, and was demonstrated by inoculation in animals.

Netter[6] observed a boy, aged three years, with varicella and urgent symptoms of laryngitis requiring tracheotomy, through the wound of which a false membrane was expelled, containing no diphtheria bacilli, but "only pneumococci with beautiful capsules and of average virulence." After some days bronchopneumonia of both bases supervened; recovery.

Rochon[7] described the following interesting case: A boy, aged two years, in the course of an attack of whooping-cough, developed severe and continued diarrhœa, with an eruption of vesicles about the anus. The examination of the clear contents of the vesicles, obtained with aseptic precautions, showed "pneumococci in pure culture" in smear preparations. During a severe fit of coughing on the eighth day of the diarrhœa a prolapsus of the rectum occurred, revealing the mucous membrane covered in places with a pseudomembranous exudate, which was removed with difficulty, leaving a red, granular base. The exudate, stained by Gram, showed "numerous pneumococci." Pneumonia of the upper portion of the left lung developed on the tenth day of the diarrhœal process, and death followed on the next day.

A. and V. Vedel[8] described the case of a child, aged two years, with bronchopneumonia at the left base and extensive pseudomembranous deposit involving the entire pharynx and the palate, lips, and nasal cavities; death after seven days from heart failure. In the pseudomembrane the pneumococcus was found in a state of purity, grown in pure culture, and proved fatal to a white rat after injection.

Ballay and Halipré[9] reported the case of a child, aged thirteen months, with bronchopneumonia, croupous exudate on both tonsils, and symptoms of laryngeal stenosis, supposed to be croupous, requiring intubation. Cultures from the tonsillar pseudomembrane showed only the pneumococcus. On the twelfth day purulent otitis media developed, but no bacteriological examination of the discharge from the ear was made. Convalescence was established on the twenty-fourth day.

Comby[10] says he has seen pneumococcic angina in two cases in infants precede pneumonia, which at first had the appearance of diphtheria.

Griffon[11] observed in a butcher, twenty-nine years old, in the course of acute pneumonia, a pseudomembranous inflammation involving the buccal mucous membrane opposite the molars on the left side, both tonsils, the palate, and the pharynx in an extensive network. Pure cultures of the pneumococcus were obtained from the pseudomembrane, and proved fatal to a mouse after injection. The croupous exudate disappeared in a few days. Tympanites was noted. A specific agglutinating reaction was claimed to have been obtained on cultures of the pneumococcus with the patient's blood.

Cases of Pseudomembranous Inflammation of Mucous Membranes of Pneumococcic Origin Independent of Pneumonia. Jaccoud,[12] who claims priority (1891) in establishing the existence of pseudomembranous angina caused by the pneumococcus, reported the case of a young man, nineteen years of age, who was suddenly taken with chill and fever, and showed on the second day a pseudomembranous exudation on both tonsils, the anterior pillars of the fauces, and the uvula. The false membrane showed all the histological characteristics of a true diphtheritic membrane, except the presence of the Klebs-Loeffler bacillus. Ménétrier, who made the bacteriological examinations, found "pneumococci in great abundance and almost pure" in the exudate, and cultures and inoculation experiments made by him "leave no doubt in this regard," *i. e.*, the pneumococcic origin of the process. The pseudomembranous process had ceased its activity by the ninth day, and the patient was well on the seventeenth day of the disease.

Jaccoud[13] also reported two similar cases in 1893, one a woman, aged twenty-six years, the other a girl of seventeen years, both with pseudomembranous inflammation of the tonsils, which made its appearance on the second day of the illness. In both cases Martin found "pneumococci in abundance in a state of purity, or sometimes accompanied by streptococci." The onset of the disease was marked by chill, shaking, and abrupt rise of temperature. Both cases terminated with recovery in three or four days. Based upon his three cases, Jaccoud attempted to draw a differential picture of pneumococcic angina, characterized by sudden onset, with chill, shaking, abrupt rise of temperature, short duration, and favorable course.

Seuvre[14] observed a boy, eight years old, who, in the course of an attack of grippe, developed an erythematous angina with signs of laryngeal stenosis, requiring tracheotomy, through the wound of which a false membrane was expelled, giving a pure culture of pneumococcus. Diphtheria bacilli were absent.

Comba[15] reported a case of pseudomembranous tonsillitis and double pseudomembranous conjunctivitis in a child of seven months, due to the pneumococcus.

Abel[16] reported a pseudomembranous inflammation in a boy of thirteen years, limited to the anterior nares, which finally disappeared after fourteen days. The deposit showed pneumococci in great abundance and a very few other organisms, but no diphtheria bacilli. Cultures and animal experiments showed that the pneumococcus was the only pathogenic organism in the exudate.

The earliest reference to pseudomembranous conjunctivitis ascribed to the pneumococcus is in the thesis by Morax,[17] who reported four cases from Parinaud's clinic, observed in the autumn of 1893, in infants ranging from eight days to two and one-half years in age. The process was characterized by the presence of pseudomembranous exudation on the lower lids, in which the pneumococcus was found pure and in abundance. The organism was grown in pure culture and recovered from animals dead after injection. The affection was always unilateral, running a short and benign course. The bulbar conjunctiva was never involved in the deposit.

Parinaud[18] reported cases of lachrymal conjunctivitis in the newborn in the first few days of life, showing fibrinous deposits or flakes mixed with the tears in the inferior cul-de-sac. In twelve cases the pneumococcus was found in abundance in the conjunctival secretion and grown in pure culture by Morax. The gonococcus and Weeks bacillus were totally absent. "This pneumococcic conjunctivitis of the newborn, as well as that of older infants, which Morax and I have described, may become pseudomembranous without ceasing to be benign, at least according to my observation."

Gifford[19] reported cases of pure pneumococcus conjunctivitis, and stated that he had also observed in these cases, as previously pointed out by Gasparini,[20] a fine pellicle of fibrin which could be wiped off from the everted upper tarsus, which had not been observed in conjunctivitis due to the Weeks bacillus.

Axenfeld[21] encountered a school epidemic of conjunctivitis, which involved twenty-four persons, showing pseudomembranous flakes. The cover-glass specimens, as well as cultures from the pseudomembranous exudate, showed characteristic pneumococci, and they were confirmed as such by Professor Behring. Animal inoculations resulted in typical pneumococcus septicæmia. The process ran its course in from

three to ten days. Small ocular subconjunctival hemorrhages were noted.

As will have been observed, most of these reported cases of pneumococcus conjunctivitis were of a character that could hardly be described, strictly speaking, as pseudomembranous—*i. e.*, with an adherent fibrinous exudate on the conjunctiva—but were characterized by the presence of small fibrinous shreds in the exudate of the eye, sometimes lightly adherent to the mucous membrane of the lids. As a similar condition may often be found in the eye in almost any kind of acute conjunctivitis, it seems impracticable to draw any sharp and fast distinction between such cases and those that are more positively of a pseudomembranous nature. Within the past five years rather numerous cases[22] of pneumococcus conjunctivitis have been reported, but they have generally been without any definite pseudomembranous deposit. Such was the condition, also, in the case which we have described. The explanation of the relative freedom of the eye from croupous deposits is doubtless found in the mechanical difficulties offered to the development of such a process by the natural irrigation and drainage of the eye.

In addition to the above cited cases, which were reported more or less circumstantially, occasional references are also found in the literature to possible cases of true pneumococcic pseudomembranous angina, in which the pneumococcus is merely mentioned as occasionally found in or grown from the croupous exudate in a small percentage of a long series of cases of croupous angina studied bacteriologically, as, for instance, in the reports by Carl Janson,[23] De Blasi and Russo-Travali,[24] Cassedebat,[25] and others. The mere mention of finding pneumococci in such cases cannot, of course, be accepted as proof of the etiological relation of this organism to the morbid process, for it is well-known that occasional pneumococci may be found in the throats of a considerable proportion of healthy persons, usually estimated at 20 per cent., and can be grown in culture from such throats. Therefore, unless the pneumococcus be found in pure culture, or else as the predominating organism in the exudate, its presence is of not much significance.

The above cases, in which the pneumococcus was demonstrated as the cause of a local croupous inflammation, have all been reported within the last dozen years, and it is thus shown how recent is the recognition of the pneumococcus as an agent capable of exciting localized pseudomembranous inflammation of the mucous membranes of different parts of the body. Doubtless it is not so rare an agent in this condition as might be supposed from the paucity of reported cases, and will be shown by future investigation to be a not uncommon cause of pseudomembranous inflammation of the mucous membranes outside of the lungs.

There is nothing to distinguish the nature of the process from the

similar condition associated with the diphtheria bacillus or the streptococcus, except the bacteriological examination, which should be made in all cases of pseudomembranous inflammation. The clinical course described by Jaccoud,[36] Weinberg,[37] and Gaultier[38] as characteristic of pneumococcus croupous angina* had no counterpart in our case, and would be of no value for excluding diphtheria, which may show the same clinical picture. As a rule, the cases have been mild, and after a short course have ended in recovery. How refractory to treatment, how long continued, and how infectious the process may exceptionally be are illustrated by our case. Most cases occur in childhood, though adults in the prime of life are sometimes affected. The mucous membranes of almost any part of the body may be involved, as illustrated by the cases cited. The process may be very limited or very extensive and almost general. It may occur in association with pneumonia during some part of its course, or may be quite independent of any pulmonary involvement. Local germicidal agents have usually been employed with apparent success, but failed entirely to have any good effect in our case. Whether due to it, or independently of it, and merely coincidently with its use—we would not venture an opinion—the process tended rather promptly to ameliorate and disappear upon the administration by mouth of drachm doses of fresh brewer's yeast.

In conclusion, we take pleasure in acknowledging our indebtedness to Professor William H. Welch, of Baltimore, for his very generous assistance in referring us to cases in the literature.

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* We have limited ourselves in this paper to a discussion of pneumococcic inflammation resulting in pseudomembranous exudation. It might be remarked, however, that the pneumococcus has been demonstrated as the cause of inflammation of the mucous membranes of all the following varieties: erythematous, follicular, herpetic, pseudomembranous, and suppurative. For a comprehensive discussion of these different varieties of pneumococcic angina and cases from the literature up to 1896, see Gaultier's thesis (loc. cit). In view of the occurrence of a herpetic or vesicular form of inflammation and the discovery of the pneumococcus pure in the contents of the vesicles, both in the throat and about the anus, it would be interesting to make observations on the contents of the herpes labialis, so commonly seen in pneumonia. It appears likely that these vesicles are caused by a local development of pneumococci, which would be found in the contents of the vesicles. We regret that such examination was not made in our case, and that we did not also examine the contents of the large vesicles that developed upon the chest, though in the latter case we, naturally enough, assumed the eruption to be merely the result of the local irritation of the turpentine that had been applied.

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ACUTE SPLENIC MILIARY TUBERCULOSIS.[1]

By D. D. Stewart, M.D.,
of Philadelphia.

That the tubercular process, whether in an acute miliary or more chronic form, may have its only outward expression in the spleen, and remain there entirely limited for a greater or less period, is a fact little

[1] Read at the Sixteenth Annual Meeting of the Association of American Physicians, held at Washington, D. C., April 30 to May 2, 1901.

recognized, yet one which has been emphasized by several recorded cases.

As a chronic affection presumed primary tubercular splenomegaly is less infrequent than the acute miliary form. Bender,[1] who has recently published an exhaustive paper on the subject of tuberculosis of the spleen, alludes to some seven cases which he regards as instances of the former. In these Bender thought that the tubercular affection of the spleen was in so far limited to this viscus that involvement of other organs or parts gave no clinical manifestation. This, however, is an error concerning at least one of the cases which Bender quotes, in which splenectomy was performed—that of Bland Sutton. In this case Bland Sutton informs me the primary lesion was in the lung, and was of the nature of a "quiescent tuberculous cavity."

In Marriott's case[2] Bender is cognizant that the source of infection was perhaps a chronic vulvar ulcer which had been excised. Marriott curiously had reported this case as one of *acute* tuberculosis of the spleen. It is said there was no clinical indication of tuberculosis elsewhere, even at the end of two years, when a splenectomy was done, and eight months subsequently the patient was in good health.

It is not the purpose of this paper to discuss chronic tuberculous splenomegaly, but to draw especial attention to an acute form of miliary splenic tuberculosis, the occurrence of which, though extremely rare, seems undeniable, and which, because of its rarity, has been doubtless occasionally overlooked. But a solitary case has been recorded—Scharold's[3]—and it is most interesting. It is that of a convict, who, apparently previously in good health and employed in out-of-door labor, was suddenly seized with symptoms suggesting an acute overwhelming general infection. There were high fever, prostration of strength, headache, cough, epistaxis, and diarrhœa, retention of urine, delirium, and general cyanosis. The spleen was greatly enlarged. Death occurred on the seventeenth day. A necropsy showed a miliary tuberculosis limited to the much enlarged spleen. In the writer's case, although he cannot demonstrate that the infectious process was in onset or in early course limited to the spleen, yet he believes it is fair to assume this in view of the interesting symptomatology and because the instance of Scharold's shows that such a limited miliary tuberculous process may occur and actually run its course without other involvement.

The writer's case was one in which more than ordinary interest was taken, both on account of its unique character and because of an acquaintanceship with certain of the patient's relations, one of whom, a

[1] Gazette des Hôpitaux, March 31 and April 7, 1900.
[2] Lancet, November 23, 1895.
[3] Aerztliches Intelligenz-Blatt, August 7, 1883, No. 32.

physician, under whose observation she had previously been, watched the progress of the ailment with him.

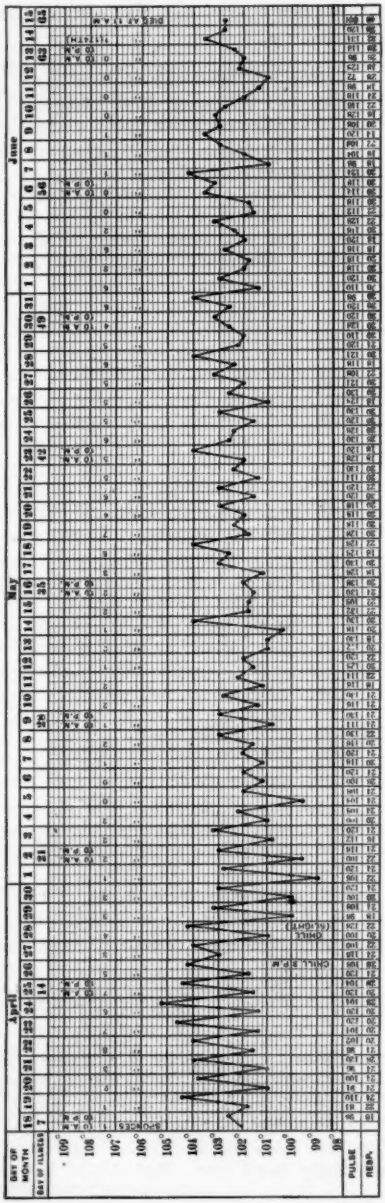
The patient was Emma W., aged twenty-nine years; by occupation a nurse; single; of German parentage and American birth; the fifth of ten children, all living save one killed in a railroad accident; brothers and sisters in good health; parents living; father a dyspeptic, but otherwise well; mother in robust health. The family history otherwise offered nothing noteworthy; no tubercular antecedents.

Previous History. She had had as a child scarlet fever, measles, and pneumonia. Had had ague seventeen years before, but had had no indications of this since. She was of slender build, but quite robust, and had had no illness to incapacitate her for years. About four weeks before admission to the hospital, after having just left a trying and long-continued case of typhoid fever, she had had a slight grippal attack lasting a few days. She was not confined to bed. Dr. Pottberg, her relative, had seen and prescribed for her. One week later, three weeks before admission to the Episcopal Hospital, when not recuperated from the grippe, ill-judged notions of humanity prompted her to take charge of a case of tuberculosis. The patient, living in her vicinity, had just lost his nurse; he was very ill and required constant attention. The consumptive, in indigent circumstances, had apartments which were badly heated and damp, and the nurse's nourishment was of poor quality. She ate irregularly, poorly, and lost sleep. She continued in charge for two weeks. In the middle of this second week she, herself, became rather acutely ill and had chills, with a rise in temperature, was debilitated, and had pain and aching in the dorsal region. She still continued in attendance for a few days despite these symptoms, until a successor could be procured, and then went to her lodgings. There she remained about a week, abed, during which time fever and debility continued. It is stated the temperature then ran between 101° and 103°, and she was presumed by her medical attendant to be developing typhoid fever. She was placed under my care at the Episcopal Hospital on about the tenth day of illness (April 18, 1900), and died the sixty-eighth day, fifty-eight days after admission.

An examination on admission elicited: Mind active, though expression dull, with tendency to somnolence. But neither the dull expression nor somnolent tendency was manifest after a few days spent in hospital. Had had slight chill every day or so since the ailment began.

Abdomen. No pain or tenderness or distention of the bowels. Spleen markedly enlarged, reaching above to sixth interspace, and inferiorly is readily palpable below the costal margin. No typhoid spots. Liver outline normal.

Chest. Heart sounds clear, though enfeebled; no murmurs. A searching examination of the lungs showed total absence of any indication of disease here. This repeated carefully daily gave similarly negative results until late in the progress of the case. The tongue was clean and of healthy appearance. This continued a feature until late in the disease. There were total loss of appetite, constipation, no nose bleed. Temperature, afternoon of admission, 102.6°. On the following day it was 101.4° in the morning, and 104.4° in the evening. It was subsequently taken every third hour throughout the entire course of the case.


April
May
June
DIED AT 11 A.M.
CHILL 8 P.M.
CHILL (SLIGHT)
SHOWERS
PULSE
RESPS.

The accompanying (abbreviated) chart shows the daily morning and evening temperature, and that the fever was a continuous one, with morning remissions and evening exacerbations. The average range was between 101° and 104°. The temperature only once reached 99° (in the morning), and but on one occasion (in the evening) 105.2°. The pulse was usually accelerated. The lowest noted was 84, and the highest 140. It showed wide and irregular variations. The number of respirations per minute were commonly in direct ratio to the body temperature.

Widal reaction and examination for plasmodia (Ghriskey) negative. (These examinations were made subsequently on alternate days for two weeks, with similar negative results.) Leucocyte count on admission, 5600; urine, faint albumin trace; microscopically (centrifuged specimen), but one hyaline cast noted; otherwise negative. In arriving at a diagnosis the following ailments were considered: typhoid fever, æstivo-autumnal malarial fever, and acute miliary tuberculosis. The last was almost immediately suspected, and within a few days decided upon, but solely by exclusion, as the general features of the case were unlike those of other cases of acute miliary tuberculosis I had encountered. Here there certainly was as yet no lung involvement, and no signs of abdominal implication other than the presence of the enlarged palpable spleen. The marked splenic enlargement, indeed, was the only notable physical sign other than the persistently high temperature and debility. There were for many days no other noteworthy clinical symptoms, apart from occasional abdominal pain referable to the splenic region, and a tendency to cyanosis and continued blueness of the extremities when cold sponging was resorted to to reduce temperature. The patient's mind was clear and active, and she constantly reproached us for not ridding her of the fever, which she regarded as the only symptom of illness, that she might return to her home. Without other developments the patient's condition underwent little change for the greater part of the fifty-eight days. The lungs were carefully auscultated daily, with negative results, until about two weeks before death.

On May 14th (approximately the thirty-sixth day of the disease) two small glands were palpable in the left supraclavicular fossa. This was the first evident indication of dissemination of the tuberculous process. An ophthalmoscopic examination on this date (Dr. Van Pelt) showed congestion of retinæ of moderate degree limited to each nasal side above the disk, more marked in O. S.

Toward the end of May marked debility was present as a natural result of the continued fever. She took but little nourishment, although free from gastro-intestinal symptoms. At this time fine râles were evident now and then in both lungs. These, with vesiculo-bronchial breathing, were first noted posteriorly, her continued dorsal decubitus favoring stasis in the posterior surfaces of the lungs. On June 1st she had several spells of nausea and vomiting, and pain was complained of in the abdomen. Vomiting now recurred almost daily until death. She became delirious at night and had headache by day. It was noted on June 5th that the general body surface was markedly hyperæsthetic; jerking and twitching of the limbs had occurred the evening before, and she frequently now gave a sharp outcry. She had been slightly deaf for several days, and was now markedly so. On June 12th the bedside notes record: "Deafness less apparent; responds more readily when

questioned, though commonly delirious. Apparently is free from unprovoked pain, but remonstrates when the abdomen is palpated. Frequent twitching of upper extremities, and these movements are accompanied by a harsh cephalic cry. Kernig's sign is absent. Tache cerebrale marked. Abdomen much distended. Tongue for first time dry and brown in color, sordes appearing. Pulse intermittent. Yesterday bright red circular area, about one inch in diameter, appeared on the back of the left hand. It had a distinct white border, and was covered with vesicles. The whole hand was swollen and somewhat red. To-day vesicles have united into one very large one, and similar spots have appeared on thumb and fingers. Cultures from the vesicles show staphylococci." On June 15th the notes state: Patient rigid for the past two days. Kernig's sign still absent. Drooping of right eyelid noted. Emaciation now becoming extreme. Area on hand has formed superficial slough. The patient's outcry is less shrill, and jerking of the limbs less marked. She is more or less comatose, constantly moans, and no longer responds rationally to questions. Marked weakness is apparent. Pulse continues intermittent. Patient died cyanosed on the morning of June 15th.

Clinical pathologist's (Dr. Ghriskey) report: No indications of kidney involvement until late in the case. Albumin and casts absent in the early period of the disease. Numerous blood inspections negative, save for a leucocytosis first noted June 12th. Several examinations of the erythrocytes were made, the last May 10th: 3,800,000. Hæmoglobin, estimated on several occasions early in the disease, 65 to 75 per cent. Leucocytes frequently estimated; counts ran between 5000 and 6000 until on June 12th, 14,800 (terminal infection). Malarial parasites, frequently examined for early in the case, always absent. During the first week the blood was also drawn from the spleen for this examination. Unfortunately tubercle bacilli were not examined for in this specimen. Cultures from this (for typhoid) were made; result negative. In the middle period of the disease 4 c.c. of blood from a vein was diluted, centrifuged, and examined for tubercle bacilli; result negative. Several sputum examinations were made the last of May and early in June and no tubercle bacilli found. Diazo reaction examination on several occasions was negative at first, but positive on May 7th. Cultures from vesicles on hand and from meninges of brain showed staphylococci. Other cultures at post-mortem negative.

Report of the necropsy and gross and microscopic examination of specimens by the Episcopal Hospital pathologist, Dr. W. E. Robertson, June 15, 1900: The body is that of a slender young woman. Rigor mortis absent. A large bulla noted on dorsum of left hand.

Thoracic Cavity. Lungs and heart taken out together. Heart presented nothing abnormal. Lungs the seat of diffused, very small miliary tubercles. No consolidation. Lungs crepitated throughout. Moderate pleural adhesion on both sides. Several medium-sized lymph glands in left supraclavicular fossa, enlarged and caseated, and resting upon subclavian artery.

Abdomen. Slight amount of fluid and some injection of intestines. No tubercles on mesentery or peritoneum. Intestines and stomach were examined throughout. No typhoidal or tubercular lesions. A few shallow ulcers or erosions in the ascending colon. Liver slightly fatty but firm, and presented fairly numerous minute tubercles through it.

No gallstones. Duct patulous. Kidney capsules stripped with ease. Section showed cloudy swelling, apparent slight interstitial change. Few small miliary tubercles evident near capsule.

The most noteworthy feature of the examination was the spleen. This was about four times the normal size. It was studded on its peritoneal coat with elevated yellow tubercles the size of a large pea, and surrounded by an inflammatory zone. "On section the whole organ was found to be a mass of tubercles, varying in size from a pin-point to 4 mm. in diameter. These, to about the extent of one-half of the spleen, had advanced to complete caseation, converting this part of the gland into a confluent tubercular mass, in which, while the outline of some of the tubercles was still apparent, in the greater part there was merely evident a most marked cheesy necrosis. Such a condition was found nowhere outside the spleen."

Pancreas normal. Bladder distended. Wall thick-looking, and vessels in it turgescent. Urine blood-tinged. Wide-spread submucous extravasation of blood. "Blood could be neither wiped nor washed off. There was nothing to explain this high grade of hyperæmia, which resembled that met with in some cases of paraplegia, or where the circulation through the inferior cava is interfered with. Such a condition is sometimes seen in hemorrhagic diseases, such as scurvy, and it is possible that in this case the intensity of the infection may have induced it as it did the blood extravasations in the kidney and spleen."

Brain. Dura bulged on removing skullcap. Large amount of fluid escaped when it was cut. It was quite adherent over region of Pacchionian bodies. In this region, too, a slight amount of puriform material was found, and also in a few other places scattered irregularly over the cortex, these latter in the subarachnoid space apparently. Adhesions in fissures at base. Miliary tubercles along small vessels in fissure of Sylvius. Cord not removed.

Histological examination of liver, kidneys, and spleen.

Liver. Parenchymatous degeneration. Slight increase of perilobular connective tissue, and a tendency to multiplication of bile capillaries. Numerous microscopic miliary tubercles, the large majority being in an early stage, only an occasional one presenting some cheesy necrosis. There was no confluence of tubercles.

Kidney. Slight diffuse parenchymatous degeneration. Numerous microscopic miliary tubercles, for the most part early, though there were a few which were decidedly degenerated in their centres, and here and there some coalescence had taken place, so that the mass was visible to the naked eye, though very small.

Spleen presented the most pronounced tuberculous condition far more than any other organ in the body. In addition to countless miliary tubercles in a comparatively early stage, these being far more numerous than found in the other organs, were confluent tubercles, many of them small, others very large, and all in an advanced stage of necrosis, about one-half of the organ being appropriated by this conglomerate tubercle mass. Both kidneys and spleen were much congested and extravasations of blood were common, especially in the spleen.

There is an interesting similarity between the case of the writer and that of Scharold before mentioned. Like Scharold's, my patient became acutely ill, but evidently having greater resisting power, the manifes-

tations of general infection were much less overwhelming, and the duration of the ailment considerably more extended. Scharold's case died on the seventeenth day, mine on the sixty-eighth. As in Scharold's case, enlargement of the spleen was noticeable early. This, with other acute manifestations, had naturally caused the attendant prior to admission to the hospital to regard the ailment as typhoid fever, and the patient was admitted to the hospital with this diagnosis. Unlike Scharold's case,[1] symptoms and physical signs suggestive of pulmonary involvement were totally absent, and their continued absence, with a similar dearth of indications of localization of the tuberculous process elsewhere than in the spleen, was regarded as most singular. As detailed in the history, other than the splenic enlargement and the continuous and rather high temperature, there was a curious absence of symptoms through the greater part of the course of the case. The splenic enlargement reached its maximum rather early, and showed no increase after the third week of illness. The spleen was not notably sensitive to pressure until late in the disease. Unlike Scharold's case (Scharold gives only the macroscopic appearances of the presumed uninvolved organs) the tubercular process had generalized when death occurred. Miliary tubercles were then evident in the brain, lungs, liver, and kidneys. Those in the lungs, though disseminated, were recent and minute, and there were no indications of consolidation. There were also but few tubercles manifest macroscopically in the liver and kidneys, and none existed in the peritoneum or in the gastro-intestinal tract, uterine appendages, or bladder. The process was so extensive and advanced in the spleen, and so extraordinarily out of proportion to that encountered elsewhere, that Dr. Robertson, though unaware of the history, at once remarked the case was evidently one of primary miliary tuberculosis of this organ, and this, I believe, we must so regard it.

Infection in this case apparently arose through the consumptive the patient was nursing. It must, of course, have occurred early in her contact with him, as symptoms appeared acutely about the middle of the second week. She had gone to the case for humanitarian reasons, and, contrary to the advice of her friends, a week after the onset of a mild attack of supposed grippe. Though this had not confined her to the house, she stated she still felt weak. Immediately prior to this she had left a convalescent typhoid patient, in which case she had been the sole nurse, and had continued with it for two months. She was then ill prepared to undertake the arduous duties which devolved upon her in nursing the consumptive. As before remarked, this patient's rooms were damp and cold, and the nurse was constantly in attendance, lost much sleep, and was poorly fed.

[1] I was then unaware of the case of Scharold. My attention was drawn to it subsequently by Dr. W. E. Robertson.

NOTE UPON A CASE OF CARDIA DUPLEX IN A TURKEY.

By Allen J. Smith, M.D.,
of Galveston, Texas.

(*From the Pathological Laboratory, University of Texas, No. 5, 1901.*)

The specimen upon which this note is based came into the writer's hands in so unfortunately marred a state that many of its interesting features could only be surmised, and for this reason it has seemed advisable to record, without any extended discussion (which under the circumstances could have led to little at best), the occurrence of the anomaly and to briefly describe the condition as far as definitely shown in the specimen.

Several months ago two of the students of the second-year class in medicine in this institution—Messrs. Ferguson and Reifel—brought the writer two hearts which they stated had on the previous day been taken from a turkey in its preparation for the day's meal. The housekeeper in removing the viscera first dragged out the smaller of the two organs, not having recognized its double, and remarked its small size; and in a moment, feeling the larger organ, dragged it forth in turn. Realizing that the condition was a very unusual one, she kept the two specimens, and on the return of the students to their rooms the same evening she brought the hearts to them as a curiosity. In the meantime the turkey had been cooked and eaten. As far as could be learned, however, there was noted nothing in the appearance of the fowl suggestive of any abnormality or disease, and it was said to have been a female turkey of ordinary size.

On examining the specimens, both with the pericardial sac gone and the vessels at the base of each heart torn away (the veins almost entirely torn out of the auricular walls, the arteries persisting for a short distance beyond the cardiac walls), it was evident from the existence of a flattened surface on each where the two organs had been in apposition, and from the correspondence of auricular tears, that the two were originally continuous, one right auricle serving for both and uniting the two organs at the base, as indicated in the diagrams. The larger organ weighed 13.5 grammes, the smaller 4 grammes. The measurements of the larger were as follows: circumference at base, 8 centimetres; length of left ventricle (outside measurement), 4.5 centimetres; thickness of the wall of the left ventricle, 0.8 centimetre; thickness of the wall of the right ventricle, 0.2 centimetre. The measurements of the small organ were as follows: circumference of base, 5 centimetres; external length of left ventricle, 3 centimetres; thickness of wall of left ventricle, 0.4 centimetre; thickness of wall of right ventricle, 0.15 centi-

metre. The volume and weight proportions are thus seen to be nearly uniform, except that the wall of the left ventricle of the larger heart is proportionately thicker than that of the smaller, and, on the contrary, the wall of the right ventricle of the smaller is proportionately thicker than that of the larger organ.

In the accompanying diagrams the hearts have been drawn as if still united, the first and second figures representing fairly the external appearance of the specimen from ventral and dorsal aspects, the third and fourth figures being merely diagrammatic representations of the interior arrangements of each heart separately. In Fig. 1, a ventral view of the two hearts, the various parts are indicated by letters as fol-

FIG. 1.

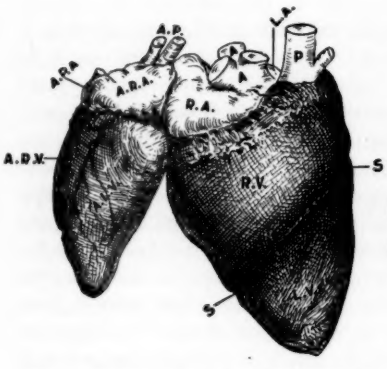


FIG. 2

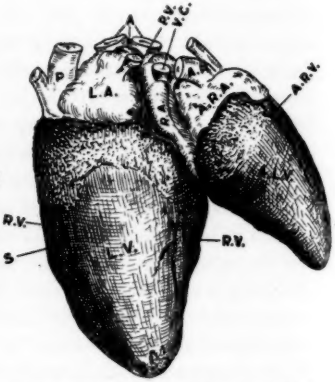


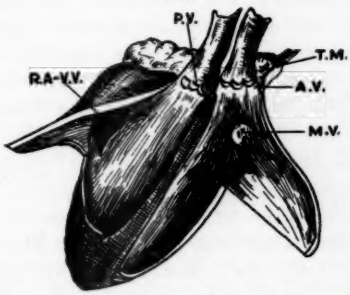
FIG. 1.—Ventral view. *L. V.* Left ventricle. *S.* Interventricular septum. *R. V.* Right ventricle. *A. L. V.* Left ventricle of small organ (accessory left ventricle). *A. R. V.* Accessory right ventricle. *R. A.* and *A. R. A.* Fused right auricles of both organs. *L. A.* Left auricle of large organ. *A.* Aorta from large heart. *A. P.* Aorta from small heart. *P.* Pulmonary artery of large heart. *A. P. A.* Pulmonary artery from small heart.

FIG. 2.—Dorsal view. Letters as above. *P. V.* Pulmonary vein entering left auricle. *V. C.* Vena cava entering fused right auricles.

lows: *R.V.*, right ventricle of major heart; *A.R.V.*, accessory right ventricle (or right ventricle of minor heart); *L.V.*, left ventricle of major heart; *A.L.V.*, accessory left ventricle; *S.*, septum; *R.A.* and *A.R.A.*, the fused right auricles of the two organs; *L.A.*, left auricle (of major heart only); *P.*, pulmonary artery of major heart; *A.P.A.*, accessory pulmonary artery; *A.*, aorta with traces of three branches; *A.P.*, accessory aorta with two branches. Fig. 2 represents the dorsal view of the same. The letters correspond, and in addition *P.V.* indicates a pulmonary vein entering the left auricle, and *V.C.* one of the venæ cavæ entering the right auricle. The auricular wall was so badly torn that the writer could not be certain of any of the veins except this

one pulmonary vein entering the left auricle in its upper portion back of the aorta and close to the interauricular septum; otherwise this part of the wall was apparently without any entering vessels. An irregular hole in the wall of the fused right auricle at *V.C.* (Fig. 2) and another

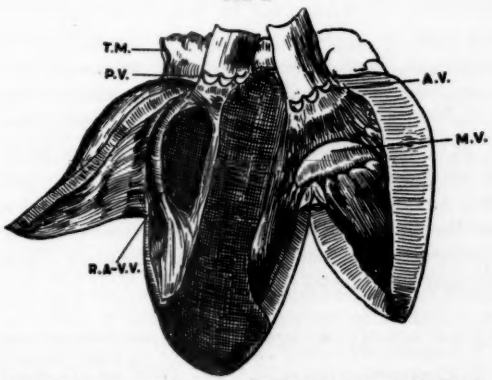
FIG. 3.



Schematic drawing of small heart laid open. *A.V.* Aortic valve. *P. V.* Pulmonary valve. *M. V.* Mitral valve. *R. A-V. V.* Right auriculo-ventricular valve. *T. M.* Torn margin of separated right auricle.

lying slightly ventral to it were accepted tentatively as the points of entrance of the venæ cavæ, and probably of the other veins entering the right auricle. Fig. 3 represents the small heart laid open. The letters indicate respectively: *A.V.*, aortic valve; *M.V.*, mitral valve;

FIG. 4.



Schematic drawing of large heart laid open. Letters as in Fig. 3.

P.V., pulmonary valve; *R.A-V.V.*, right auriculo-ventricular valve; *T.M.*, torn margin of fused right auricle rent in removal of the specimen. Fig. 4 represents a similar view of the interior of the

larger organ, and the lettering corresponds with that of the preceding figure.

It is evident that the essential anomaly, aside from the undoubted vascular irregularities lost, was due to a fusion of the two right auricles of otherwise separate double hearts in one individual, with absence of a left auricle in the smaller of the two organs. The course of the blood stream, then, must have been from the systemic veins into the united right auricles; thence through the three openings, easily determined upon exposure of the cardiac interiors, into the two ventricles of the small organ and right ventricle of the larger heart (*R.A-V.V.* and *M.V.* of Fig. 3, and *R.A-V.V.* of Fig. 4). The blood from the two right ventricles probably went to the lung; but it is quite possible that some of the venous blood passing through *A.V.* (Fig. 3) may have been driven from the left ventricle of the small heart into the arterial system. Returning from the lung, the blood probably found its way regularly through the pulmonary vein into the left auricle, and thence, passing through the mitral valve into the left ventricle of the large organ and out through the aortic opening, into the general arterial system. A curious arrangement is to be seen in the construction of the right auriculo-ventricular valve in each organ (*R.A-V.V.*). Instead of the usual three fibrous sheets met in the structure of the tricuspid valve, in each of these hearts such cusps are replaced by a comparatively thick, fleshy fold of the wall of the ventricle, attached above to the auriculo-ventricular septum or close to it, and closely adapting itself against the interventricular septum when closing the opening. In the smaller heart, as represented in Fig. 3, a small fibromuscular band or sheet attached to the auriculo-ventricular and interventricular septa serves to some slight extent as an opposing sheet to this muscular valve. A proportionately smaller, less distinct structure of the same kind is seen as well in the larger organ. In each heart the inner surface of the right ventricle was peculiarly void of the usual pectinate muscles and papillary muscles, and was quite smooth. In the absence of other data the writer prefers to forego discussion and comparison with the occasional similar findings of other observers;[1] but believes the extreme rarity of the anomaly and its functional importance make it worthy of at least this passing notice.

[1] Gould and Pyle, in their work upon anomalies and medical curiosities, make the following statement: "Duplication of the heart, notwithstanding the number of cases reported, has been admitted with the greatest reserve by Goeffroy-St. Hilaire, and by a number of authors. Among the celebrated anatomists who describe duplex heart are Littre, Meckel, Collomb, Panum, Behr, Paullini, Rhodius, Winslow, and Zacutus Lusitanus. The 'Ephemerides' cites an instance of triple heart, and Johnston has seen a triple heart in a goose."

REVIEWS.

A Practical Treatise on Diseases of the Skin. For the Use of Students and Practitioners. By James Nevins Hyde, A.M., M D., Professor of Dermatology and Venereal Diseases in Rush Medical College, Chicago. New (sixth) edition. In one octavo volume of 832 pages, with 107 engravings and 27 full-page plates, 9 of which are colored. Philadelphia and New York: Lea Brothers & Co., 1901.

New editions of this well-known treatise continue to appear with a frequency and regularity that must be extremely gratifying to author and publishers alike; but little more than a year has passed since the appearance of the fifth edition, and already it has been found necessary to issue a new one. Owing to the brief period which has elapsed since the publication of the last edition, no very great or important additions are to be found in the present one; but that the author has found it necessary to make a considerable number of changes to bring his treatise up to a date is evidence not only of his care in revision, but of the zeal and industry with which this department of medicine is being cultivated at the present time. A considerable number of sections have been partly or entirely rewritten, and the definitions in small type, which in previous editions headed the sections, have been omitted, the latter being, in our opinion, a decided improvement in the arrangement of the text.

We regret to note that the affection first described by Leloir under the name conglomerative pustular perifolliculitis is still placed among the inflammations instead of among the parasitic diseases, where we believe it properly belongs. We are quite convinced that there is ample evidence to prove that it is a trichophytic folliculitis, and should, therefore, be considered among the diseases due to the ringworm fungus.

The author is apparently more inclined than formerly, along with many other authorities, to look upon zoster, in some cases at least, as an infection—a view to which some of the features of the disease, such as the infrequency of second attacks, its occurrence in epidemics, and its proven contagiousness in some instances, lend much probability.

While admitting the presence of the microbacillus of Sabouraud and Unna in the lesions of acne, a very conservative attitude is maintained as to the etiological importance of this micro organism—a conservatism which is only to be commended.

The section upon blastomycetic dermatitis, a subject with which the author's name is so intimately associated, has been renamed blastomycosis of the skin, a much more appropriate term than that formerly employed; and considerable new matter has been added based upon further studies of the malady. The brilliant results obtained from full doses of potassium iodide, as first suggested by Bevan in some of his

cases, lead to a more emphatic recommendation of this drug in the treatment of the disease.

This new edition is a worthy successor of those which have preceded it, and the student, the practitioner, and the specialist may consult its pages with the assurance of finding reliable information concerning the subjects pertaining to dermatology. M. B. H.

PULMONARY CONSUMPTION, PNEUMONIA, AND ALLIED DISEASES OF THE LUNGS. Their Etiology, Pathology, and Treatment, with a Chapter on Physical Diagnosis. Illustrated. By THOMAS J. MAYS, A.M., M.D. New York: E. B. Treat & Co.

DR. THOMAS J. MAYS, Professor of Diseases of the Chest in the Philadelphia Polyclinic, and Visiting Physician to the Rush Hospital for Consumptives, is so well known as a writer and lecturer on diseases of the chest, and has had such wide experience in the study of these maladies, both here and in the large consumptive hospitals of England and the Continent, that his utterances on the subject elicit more than ordinary interest.

The book is as instructive as it is exhaustive, for its author seems during his studies abroad to have possessed himself of the German habit of tracing every subject to its remotest origin, and reasons *à priori* so convincingly that you cannot but feel with him say, for example, that the popular germ theory of the origin of consumption is based upon incomplete premises, and that it is only necessary to go a little further back in order to be convinced of two fundamental facts, namely, that phthisis pulmonalis, or so-called tuberculous phthisis, does not have its origin in the lungs, and that instead of its being due to the importation into the system of the bacilli of tuberculosis, as is popularly believed, these, on the contrary, are the result rather than the cause of the disease—incidents in the development of the malady—not making their appearance until it is well advanced rather than the prime factor in its creation.

This conclusion in itself is sufficiently startling—we might say gratifying—for these germ-ridden days, when pathological and bacteriological alarmists teach that we must not kiss our children "except on the cheek" for fear of receiving or transmitting disease; that we must not breathe the same air with the poor and neglected for fear, not of moral, as in the olden times, but of physical pollution; that we must not drink from the same cup, or use the same spoon, or eat from the same plate; and that we must not even shake consumptives' hands unless they have been previously boiled in the ubiquitous sterilized or bichloride water of the germ-mad theorist.

Thus in these bacteria-dementia days, when almost every medical publication teaches with monotonous iteration that there are bacilli in stones, spirilli in the running brooks, and streptococci in everything, it is, indeed, a delight to learn from such a careful observer as Dr. Mays that although tuberculosis may perhaps be conveyed to man by inoculating and feeding him with tuberculous matter, yet there is nothing to prove that tuberculosis is in any way contagious, experience here being widely at variance with theory. It would seem, too, that none of the

great consumption specialists believe in the contagiousness of consumption, because there is nothing to actually show that the disease can be transmitted, as the commonly recognized contagious diseases are, from one person to another.

The chapters on the therapeutics of consumption are also of supreme importance because of the extensive experience of their author in the treatment of consumption in conjunction with other means by the injection of silver nitrate over the course of the pneumogastric nerve in the neck.

Such treatment as this is logically indicated by the theory of the origin of the disease being in the nervous system.

This method has not been adopted, as has been misunderstood, on the supposition that there is anything *specifically* valuable or curative in silver nitrate over any other equally mild and convenient irritant, for this drug has been selected by Dr. Mays in preference to others merely because of the facility with which it can be used, and also because of its active counter-irritating effect when injected over the course of the nerve that controls respiration.

It is the inflammation rather than the drug *per se* that causes such marvellous control of otherwise uncontrollable cough. Any other drug capable of setting up a similar inflammatory process would be equally effective. Most of us are familiar with the effect of tincture of iodine painted over the neck in controlling the paroxysms of whooping-cough. Any other equally counter-irritating drug would have the same effect, and it is this same stimulation transmitted in some unknown way, perhaps to the pneumogastric, that increases the appetite, arouses assimilation, and enables the system to regain its metabolistic equilibrium, so that as a rule patients gain flesh rapidly while under its control, and ultimately lose the cough habit or the necessity for cough.

Another exceedingly interesting part of this volume is the chapter on the Clinical View of Acute Pneumonia from the Stand-point of Nervous Development. This is a well-reasoned and lucid arrangement of the facts in the development of the disorder from its ultimate beginning as an uncomplicated neurosis to its final manifestation, as inflammation of the lungs. And, as its author says, "there is no other theory points out so forcibly that the fundamental position of pneumonia naturally belongs to the family of nervous diseases." Disease of the vagus, for example, is known to be a frequent cause of disease of the lungs.

Therapeutics of Pulmonary Consumption and of Acute Pneumonia, and the chapters on Acute Bronchitis, Chronic Bronchitis, Asthma, and Pleurisy, respectively, are full of wise suggestions, shrewd observations, and valuable practical hints. In the perusal the reader is convinced that he is being taught about all that there is to be taught of practical value, and that by mastering the use of the armamentarium suggested he is in a position to grapple intelligently with these patience-exhausting disorders.

In conclusion, we feel the profession owes a debt of gratitude to Dr. Mays, if for nothing else, because of his synopsis of the history of the mistaken attempts that have been made in various countries to prevent the spread of consumption by isolation of its victims, based as they have been on the false theory of its being contagious, and especially of the Draconian measures adopted in Naples and other parts of Italy.

M. W.

OPERATIVE AND PRACTICAL SURGERY. FOR THE USE OF STUDENTS AND PRACTITIONERS. By THOMAS CARWARDINE, M.D. (Lond.), F.R.C.S., Assistant Surgeon, Bristol Royal Infirmary. With 550 illustrations, most of which are original drawings by the author. Pp. 630. Bristol: John Wright & Co. London: Simpkin, Marshall, Hamilton, Kent & Co., Ltd., 1900.

A MOST practical and useful volume, in attractive print, admirably supplemented by a generous supply of cuts, which, though at times artistically crude, illustrate the text with conspicuous clearness. The author truly characterizes his volume in its preface when he says: "It deals with the art of surgery in its everyday application, and its practical bearing has necessitated considerable attention to literary perspective and light and shade, the outcome of experience."

It well achieves its aim as a concise yet comprehensive presentation of surgical examination, diagnosis, and procedure. It speaks with the authority and directness of wide practical experience, and it refers not only to modern but to the most recent—foreign and American as well as English—devices and methods.

It is divided into ten sections, and each section into chapters. The preliminary section is in itself a most useful contribution, dealing with antisepsis, surgical bacteriology, and, finally, with surgical physical examination, diagnosis, and case-taking. The need for such a chapter has long existed, and it should be welcomed by undergraduate students and hospital internes.

In the second section, devoted to bandaging, dislocations, and fractures, there is excellent detailed practical instruction. It is to be regretted that it omits to illustrate methods of suspension and of horizontal support for the application of fixed dressings to the spine, chest, or hips. In treating of Colles' fracture there is not only insufficient stress upon the necessity of thoroughly reducing posterior upward deformity of the lower fragment, but there is no mention of the necessity to institute flexion of the wrist for the preservation of reduction—be the method of splinting what it may. Furthermore, the depression for the ball of the thumb in the case of the splint, advocated by the author, is so slight that it, like the Bond splint, unless properly padded, invites posterior deformity because it extends instead of flexing the wrist. Perfect results can be achieved with these splints, but they must be so highly padded under the distal end of the proximal fragment that the oblique bar can only be grasped by the fingers on strong flexion of the wrist.

General operations are described in the third section, with a generous supply of diagrams of sutures, knots, and incisions. The surgery of the head, neck, face, and mouth occupies the fourth section; that of the chest, including the breast, the fifth. The sixth is devoted to genito-urinary surgery, gynecological as well as male. It includes the latest methods of examining and operating upon the prostate, uterus, kidneys, ureter, and bladder.

The seventh, eighth, and ninth sections deal with the abdominal cavity and organs, the mid-gut and the hind-gut. These chapters brilliantly and concisely rehearse the operative triumphs of the hour in abdominal surgery, both in method and device. The book is completed by the tenth section, devoted to the teeth, nose, larynx, ear, and eye.

J. M. S.

THE BLOOD AND ITS DISEASES. CLINICAL PATHOLOGY OF THE BLOOD. A Treatise on the General Principles and Special Applications of Hæmatology. By JAMES EWING, M.D., Professor of Pathology in Cornell University Medical College, New York City. In one octavo volume of 432 pages, with 28 engravings and 14 full-page plates in colors. Philadelphia and New York: Lea Brothers & Co., 1901.

THIS the second American text-book on the blood is sure to meet with deserved success. It differs in many respects from Cabot's book upon the blood, as it contains comparatively few statistical tables on the results of blood examinations in special diseases. One of the main objects for the preparation of the work is the reference to the later contributions to the pathology of the blood and the blood-forming organs, research upon which has been made in Germany and other countries, and the literature in reference to which is often difficult to secure.

Dr. Ewing is evidently a man of firm belief in the best method of work, and does not hesitate to express his convictions in very decided terms upon subjects upon which there may be room for some difference of opinion. In the count of leucocytes (page 36) he prefers to use the Zappert chamber and estimate the white cells with the red corpuscles. This, in the writer's experience, sometimes makes a variation of several thousand from the separate estimate of leucocytes. It is, however, a very rapid method. Under the apparatus devised for the estimate of the hæmoglobin (page 38), Gowers', von Fleischl's, Mieschner's modification and Oliver's apparatus are described. The last-named is considered a satisfactory instrument, but because of its price is not available for general use. The writer has used the Oliver instrument for some time, and found its estimate tallied well with the von Fleischl apparatus, but considers it a very impracticable instrument for ordinary use. There is no mention whatever of Dare's hæmoglobinometer, which has several advantages over those previously mentioned, and which seems, for clinical purposes at least, to be sufficiently accurate. Wright's tubes for the estimate of the coagulability of the blood are mentioned but to be condemned (page 53). Emphasis is placed upon the difference between the polychromatophilic degeneration (Ehrlich) and the granular degeneration of red cells (Grawitz), (page 86).

The reviewer has read the article upon pernicious anæmia, anæmia infantum, pseudoleukæmia, and malaria with great pleasure and profit. The pathological information contained in the article adds much to one's understanding of the diseases. Crisp, concise statements are made which show that Dr. Ewing believes in being didactic. Thus in reference to pernicious anæmia, "unless 33 per cent. of the cells (red) are distinctly over-sized the diagnosis of pernicious anæmia should be made with reserve." On page 186 he states that his conception of the pathogenesis of pernicious anæmia is that of a defective hæmatogenesis in which megaloblastic degeneration of the marrow is the pathognomonic tissue lesion, and excessive hæmatolysis a consequent result. This view is in opposition to that of Hunter, Delepine, Coleman, and many other investigators, but seems, however, to have a good pathological basis.

Ewing's position on anæmia infantum (v. Jaksch) is based upon the pathology of the disease. He is not inclined to consider it a leukæmia, a view held by some American writers, because he has failed to find leukæmic infiltration post-mortem. He feels, however, that many of

the cases reported as anæmia pseudoleukæmia infantum are either pernicious anæmia or true leukæmia; the pathological changes in his own case were in the groups of mitotic red cells and leucocytes in the hepatic capillaries, showing that the liver had resumed or retained its faculty of blood-cell formation.

The chapter on malaria occupies thirty-three pages, and it is very good. Some of the terse conclusions he reaches are as follows: "In all well-marked initial attacks of malaria or malarial fever the parasites can be found in the blood if examined within eighteen hours after the chill" (page 101). "Fatal acute malaria does not exist without the presence of parasites in the blood, or at least at some time during the paroxysm." Nocht's method is recommended as the best and most satisfactory for staining the parasites.

The book contains some thirty illustrations and fourteen colored plates, the latter being drawn by Dr. Ewing. They represent high amplifications of the blood, and strike one, therefore, as being rather crude. In most instances, however, the color is good, though Plates VIII. and IX. represent eosin and methylene-blue as much as triple staining. The malaria plates are very good. In one place (page 83) is a printer's error, for which worn type is responsible. In the index, in looking up Nocht's method, you are referred to page 370. This should be 380. Neither in the index nor in the text do you find any reference to splenic anæmia as a special clinical variety of anæmia. In the reviewer's opinion it is the most satisfying book upon the blood of which he knows. The large amount of bibliography which it contains will be of much assistance to workers in similar fields. J. A. S.

INTRODUCTION TO THE STUDY OF MEDICINE. By G. H. ROGER, Professor Extraordinary in the Faculty of Medicine of Paris. Authorized translation, by M. S. GABRIEL, M.D. New York: D. Appleton & Co., 1901.

THE difficulties encountered by the first-year medical student in knowing with what subjects to begin, what books to read, and especially in scientific nomenclature, have led the University of Paris to establish a course of lectures introductory to the study of medicine. The task of their preparation and delivery has been entrusted to Professor Roger, who has approached the subject in the broadest manner and has attained a correspondingly successful result.

In many ways, however, the title of this volume is misleading. The book, as a whole, while admirably fulfilling its avowed purpose, will appeal quite as strongly to the graduate as to the student. It is practically a summary of medical progress, with special reference to the causation of disease and to the correlation between pathological morphology and physiology.

A discussion of the causation of the various features of disease is followed naturally by the means at hand of determining the character of each case as it is presented, constituting diagnosis, and by the rational means of combating the morbid process or therapeutics.

The task before Professor Roger has been one of which we may well appreciate the difficulties, and the temptation to diverge from his sub-

ject and to discuss at length various topics of special interest must have been very great. To the practitioner the book will be a concise statement of what is vital in pathology, semeiology, diagnosis, and therapeutics, brought up to the level of the latest discussions upon these subjects, and so arranged as to give the reader a glimpse of the increasing interdependence of all branches of science. Professor Roger emphasizes the importance of the purely clinical methods of diagnosis as opposed to those of the clinical laboratory. To quote from the preface: "No one is more firmly convinced than myself of the usefulness of experimental pathology. Nevertheless, at the bedside the physician can do no better than to depend upon clinical procedure. Only in quite rare instances will he be obliged to resort to more delicate methods of investigation. I cannot admit abdication of clinical methods of investigation before the rising tide of bacteriology." However, the necessity of laboratory diagnosis is unconsciously emphasized in many places, and the book, while properly dwelling upon the importance of clinical methods, cannot but impress one with the increasing aid to medicine that is given by the modern instruments of precision.

The book can be heartily recommended, especially to students of medicine, for whom it was ostensibly written, but cannot fail to be of value to those older members of the profession who find aid and profit in the periodical summaries of medical progress, whose number is so increasing at the present time. The translation is, in general, all that could be asked, and the presswork and binding impress one as being above the average. J. D. S.

STUDIES IN HUMAN AND COMPARATIVE PATHOLOGY. By WOODS HUTCHINSON, A.M., M.D. Edited by EDWARD BLAKE, M.D. Henry J. Glaisher, 1901.

THE study of comparative pathology has but recently attracted the attention which it deserves. To the zoölogist, to the pathologist, and to the clinician it has a fascination as well as a large amount of practical value. The book which forms the text of this review presents the subject in an extremely attractive manner, avoiding, on the one hand, the too elaborate consideration of the pathological conditions discussed, and, on the other hand, going sufficiently into detail to make the book of interest to those fully versed in pathology. As it stands, the book is more useful to the practitioner of medicine than would be a more comprehensive text-book upon the same subject. It is full of suggestive thoughts bearing upon the pathology of human disease, and its perusal cannot fail to interest as well as broaden the views of the reader. The main argument which the author constantly brings up to explain pathological lesions in the human being is the lessened resistance and greater instability of parts latest developed in the scale of evolution and in those tending to return to the ancestral type. It might be said that this argument is at times rather overworked. However, it undoubtedly plays an important part in human pathology, and it is well that a clear exposition of a believer in this factor of disease should be heard. One of the most interesting chapters in the book is that upon the deformities of the chest in the light of its ancestry and

growth, in which the author shows the fallacy of the statement that in pulmonary tuberculosis the antero-posterior diameter of the chest is diminished. He explains the fact that the chest of tuberculous patients is described as flat by stating that the appearance is due to the carrying forward of the shoulders rather than to any change in the shape of the chest itself. His views in regard to the genesis of tumors are very well worth reading, although some of them can hardly be considered as proven or tenable. Instability is here also looked upon as an extremely important element in the causation of tumor formation.

While this book cannot be regarded as thoroughly scientific, it is one that will well repay perusal by physician, surgeon, and pathologist. To the busy practitioner who has not time to read the exhaustive treatises upon comparative pathology, or who could not fully comprehend them were he to take the time to do so, a perusal of the book will not only interest him, but will broaden his views of human disease processes.

F. A. P.

SAUNDERS' MEDICAL HAND ATLASES.

ATLAS AND EPITOME OF LABOR AND OPERATIVE OBSTETRICS. By DR. OSKAR SCHAEFFER, Privatdocent in Obstetrics and Gynecology in the University of Heidelberg. Edited by DR. J. CLIFTON EDGAR, Professor of Obstetrics and Clinical Midwifery in the Cornell University Medical College; Attending Physician to the Mothers' and Babies' Hospital and the New York Maternity. With 14 lithographic plates in colors, and 139 other illustrations. 12mo. Pp. 111. Philadelphia and London: W. B. Saunders & Co., 1901.

ANATOMICAL ATLAS OF OBSTETRICS, WITH SPECIAL REFERENCE TO DIAGNOSIS AND TREATMENT.

THESE two volumes have been very successful in Germany, the first reaching the fifth and the second a second edition. As the name indicates, they are, briefly, illustrated books, describing labor, and obstetric operations, and giving the anatomy of labor, with illustrations showing many common pathological conditions pertaining to parturition.

The text is based upon the teaching and practice of obstetrics which obtains in Germany. In describing the mechanism of labor two positions are recognized in each presentation, with variations caused by abnormalities in the factors of labor. As is customary with German writers, many proper names are used to describe methods of treatment and clinical phenomena. German methods are given the preference in operations and in selecting modes of treatment. The text is brief, concise, and gives a very successful epitome of obstetric practice. Some forms of treatment differ considerably from those employed in this country. While the description of eclampsia is clear and comprehensive, its treatment receives brief consideration. Puerperal septic infection is fully described, but the operative treatment of this condition is scarcely mentioned. The mercurial treatment and other methods addressed to the constitution of the patient are described.

The text is valuable for the amount of scientific information compressed into a small space. The text is most valuable in the description

of the anatomy of the genital tract and the pathology of the complications occurring in obstetric practice. It has been made clear and very readable by Dr. Edgar's interesting translation.

The illustrations are numerous, and some of them original and novel. Many colored plates are inserted, usually to advantage, although in some the colors are so dark as not to be entirely successful. The diagrammatic plates are clear and illustrate the subject well.

The book is of very convenient size, and will be found useful by students and by practitioners who wish to review briefly an obstetric topic. The book is especially valuable in studying the diagnosis and pathology of obstetric conditions. E. P. D.

ATLAS AND EPITOME OF OPHTHALMOSCOPY AND OPHTHALMOSCOPIC DIAGNOSIS. By PROF. DR. O. HAAB, Director of the Eye Clinic in Zurich. From the third revised and enlarged German edition. Edited by GEORGE E. DE SCHWEINITZ, Professor of Ophthalmology, Jefferson Medical College, Philadelphia. With 152 colored lithographic illustrations and 85 pages of text. Philadelphia and London: W. B. Saunders & Co., 1901.

COMPARISON of this the latest edition of Haab's well-known *Atlas of Ophthalmoscopy* with the first two editions is most favorable. In it we find that in addition to the vast number of most valuable sketches which previously appeared in the work, the author has given us several excellent pictures of some of the rarer forms of ophthalmoscopic representation of local disturbance and general disorder. Among these may be mentioned glioma, leukæmia (this latter sketch being particularly good), traumatic macular disease, hyaline bodies in the vitreous layer of the choroid, and the most peculiar type of senile pigmentation of the retina. To these the editor has added two exquisitely painted sketches, showing angiod streaks in the retina, with one giving the ophthalmoscopic appearances that are seen in arterio-sclerosis.

The text is arranged in a logical order, and reads both well and easily. Careful examination of it shows that it is replete with interesting matter that is of value not only to the special student in ophthalmology, but to practitioners who are well advanced in ophthalmic practice. In a number of instances instructive colored drawings, with appropriate text that illustrates and describes the microscopic appearances of some of the related ocular lesions, have been usefully inserted.

Both the author and the editor are to be congratulated upon the improved appearance of their past efforts and the increased usefulness of their conjoined undertaking. C. A. O.

TEXT-BOOK OF THE PRACTICE OF MEDICINE. By DR. HERMANN EICHHORST. Authorized translation from the German. Edited by AUGUSTUS A. ESHNER, M.D. Two volumes. Philadelphia and London: W. B. Saunders & Co., 1901.

THE original Eichhorst's *Practice of Medicine* is so well known as a standard text-book of value that no extensive notice of it is required.

The translator has performed his office well, not only in the actual rendering of the work into English, but also in judiciously adding an occasional note bringing the matter considered in the text up to date. The note on the absurdly short section on diseases of the pancreas saves the discussion of diseases of this organ from being absolutely useless. In certain places it seems to the reviewer that other notes could have been added with advantage. For instance, in regard to the treatment of acute pleurisy nothing is said in relation to the diet which is calculated to aid the absorption of the effused fluid, while under operative treatment only one form of apparatus is described, the aspirator not being mentioned, and the practical details of this minor operation, which are ordinarily given in full, are entirely omitted. Also, under typhoid fever there is little mention of what is certainly an important and well-recognized method of treatment, the use of the systematic cold bath. Whether or not the author believes in this method of treatment it certainly deserves mention in a text-book of practice. Under dysentery nothing is said of the supposed rôle of the bacillus described by Shiga in its causation. The older conservative statements of the author in regard to the surgical treatment of appendicitis are modified by a brief note inserted by the translator. It seems strange at the present time to see advocated the employment of from six to ten leeches for the relief of the pain of acute appendicitis and the employment of saline baths, mercurial ointment, and iodide of potassium treatment for the promotion of the removal of "painless residua of exudate" following the acute attack. The work is not one that will be apt to be referred to by the practitioner of medicine, although, owing to the simplicity of its arrangement and numerous illustrations, it will be of considerable use to the student. F. A. P.

A Book of Detachable Diet Lists. Compiled by Jerome B. Thomas, A.B., M.D. Second edition, revised. Philadelphia: W. B. Saunders & Co., 1900.

These diet lists are now so well known that a review of them seems hardly necessary. The prescribing of diet in private practice, while of the most essential, is also one of the most difficult matters to deal with. Almost every plan that can be adopted has certain drawbacks. A mere enumeration of the list of articles which the patient must avoid is unsatisfactory to both patient and physician—to the patient, because when articles to be avoided alone are mentioned it seems as though there was nothing he could take; to the physician, because of the impossibility of carrying in one's mind the articles of diet which bear upon the particular case, and because of the indefinite character of his instructions so given. Two courses are open in trying to properly advise our patients in this extremely important branch of treatment. One of these plans is to use some such lists as those under consideration, the other the employment of a printed sheet in which the articles of diet are enumerated with columns wherein can be placed the directions as to the admissibility of each of them. After a quite extended experience with both plans it would seem that each plan has its advantages for different patients, the diet lists of Thomas being more convenient and

time-saving than is the other list. The various directions that are given for the ten classes of cases are most excellent. Only one criticism can be made, and that may seem at first sight a trivial one. In almost all the text-books and special articles on the dietetic regulations proper in diabetes we find the statement is made that cranberries are admissible. While the cranberry itself would not be harmful to a diabetic the amount of sugar with which cranberries are always cooked makes the free use of this article, in the only form in which it is palatable, far more harmful than would be many other articles of diet more satisfactory to the patient in his hunger for amylaceous and saccharine food. In making up a dietary for any individual it is important to remember not only the chemical composition of the articles in question in their raw state, but, what is more important, their composition when brought on the table.

In addition to the detachable diet-lists for various diseases, there are added at the back of the book useful lists in regard to the sick-room dietary, and the methods of preparing and administering nutritious materials by the rectum.

These lists will be found most useful, but it is to be borne in mind that in prescribing diet for an individual case the physician should read over the list in order to adapt it to the needs of the individual patient, as the routine prescribing of diet is no more possible than is the routine prescribing of drugs. F. A. P.

A TEXT-BOOK OF PHARMACOLOGY AND THERAPEUTICS, OR THE ACTION OF DRUGS IN HEALTH AND DISEASES. By ARTHUR R. CUSHNY, M.A., M.D. Aberd., Professor of Materia Medica and Therapeutics in the University of Michigan; formerly Thompson Fellow in the University of Aberdeen, and Assistant in the Pharmacological Institute of the University of Strassburg. Second edition, revised and enlarged. Pp. xiv., 732. Philadelphia and New York: Lea Brothers & Co., 1901.

THE object of the author of this book, as he states it, is "to bridge over the hiatus which exists between the phenomena occurring in the normal organism and those which are elicited in the therapeutic use of drugs, to show how far the clinical effects of remedies may be explained by their action in the normal body and how these may in turn be correlated with physiological phenomena." In other words, he chiefly desires to place the application of remedies in the treatment of disease on a sound, experimental basis. Thus far the sequence of events is precisely that of experience. The fact reached by empiricism often awaits years for a satisfactory demonstration in the laboratory for its explanation; for example, quinine in the treatment of malarial fever; digitalis in cardiac diseases. On the other hand, to deduce therapeutical indications from the facts of laboratory research is by no means a method always to be pursued with either certitude or profit. Not that we would disparage the facts determined in the laboratory, but we would suggest that the interpretation of these facts may be various according to the training or the stand-point of the observer. While the argument of the laboratory is final when dealing with empirically ascertained and

generally accepted data, to reverse the process is sometimes to invite the disaster to which prophets are particularly liable. From the standpoint of the pharmacologist striving to give logical explanation to and to place on a substantial foundation the every-day work of the clinician, this book is without an equal in the English language. In reading it we marvel at the industry of the author in collecting from the literature the vast assemblage of pharmacological facts. If we are not to be accounted captious we would suggest that all of our knowledge is not of German origin, but that France and Italy are vying with our own country in adding to a science that will endure. While we regard this work as a text-book of pharmacology and containing nothing which a student should not know, or with a fair degree of diligence cannot acquire, the application of these facts to the work for which this study is a part of his preparation is not always clear. What therapeutics—the application of remedies to the treatment of disease—this book contains is sound. There is, however, much that apparently has not suggested itself to the author. There is much, also, that needs the correlating influence of the expert clinician before it is readily available for use. Be it far from us to underrate the importance of laboratory work to which many years of our earlier life were devoted, but, on the other hand, let us not discourage the earnest workers who are doing magnificent work, because we overrate the possibilities of experimental research. Where this work fails of attaining its highest practical value is in the amount of therapeutics, and, in some instances, failure to correlate laboratory and clinic. Such might be noted as regards resorcin (p. 394), sparteine (p. 259), chlorine (p. 568), strontium (p. 558). We are particularly pleased that Burge's theories concerning iron are finally disposed of (p. 640). Of minor matters cacodylic acid is of sufficient therapeutical interest to have received more attention. Harrington's scholarly work on formaldehyde should influence every writer on the subject, and, finally, while Roberts' paper upon the action of opium on malarial fever is noticed the point of the paper seems to have escaped the author (pp. 217, 218). An important omission is that of the use of alcohol in carbolic acid poisoning (p. 393). The use of copper in phosphorus poisoning we are inclined to regard as of doubtful utility (p. 666), although it was formerly recommended. We believe that strict adherence to pharmacological nomenclature should be insisted upon, particularly in books intended for the use of students; in this the author, in company with others, is remiss. Since the errors are corrected with little difficulty, we trust in the next edition these blemishes will be removed. We have read this book painstakingly and thoroughly, and we have come to the end with unflagging interest. The amount of information which it contains is vast, and its presentation excellent. So far as concerns pharmacology, we believe its success is merited and will be continued. We cordially recommend the work and predict that its future will be still more brilliant.

R. W. W.

PROGRESS

OF

MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

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Joint Affections in Scarlet Fever.—Homa (*Wiener klin. Wochenschrift*, 1901, xiv., 281), during five and a half years in the Hospital for Contagious Diseases in Brunn, observed 506 cases of scarlet fever, in 14, or 2.8 per cent., of which there were complicating joint affections. These came on at the end of the first week five times; at the beginning of the second once; at the end of the second week four times; in the third week three times, and in the fourth week once. The onset occurred with a rise of temperature if fever were not already present, and tenderness and swelling of the joints. In the cases which did not end fatally from other complications or from the severity of the infection, the symptoms diminished in a few days. In six cases there occurred one, in one case two relapses. The joints of the hand were affected eight times, twice on both sides; the elbow-joint seven times, twice bilaterally; the knee-joint five times, four times bilaterally; the ankle-joint four times, twice bilaterally; the shoulder-joint and hip-joint each once. As a rule, various joints were affected at the same time. In one of these fourteen cases only was there suppuration. The treatment consisted mainly of rest, the application of Priessnitz's bandages, and, in four cases, salicylate of sodium internally. All but two of the cases were of moderate or extreme severity, other complications being present.

He concludes that joint affections in scarlet fever belong to the rather frequent complications; that in most cases they begin as an acute synovitis, with fever, pain, and swelling, the latter of which may be absent. Suppurative forms are rare. The onset occurs usually in the first or second week—that is, at about the beginning of desquamation—and the hand, elbow-, knee-, and hip-joints are those more commonly affected. The joint affections are usually multiple, and, occasionally, relapses follow. Endocarditis may occur, and is probably caused by the poison of scarlet fever, as is the

synovitis. With rest, immobilization, and Priessnitz's bandages recovery occurs in a few days. Salicylic acid appeared to have no especially favorable influence. Even purulent synovitis may end in recovery.

Frequency of Typhoid Bacilli in the Blood.—For many years subsequent to the discovery of bacillus typhosus by Eberth, in 1880, the attempts to cultivate the organism from the blood proved almost invariably negative. Subsequently a few isolated cases of typhoid septicæmia were reported. Wissokowitsch found that bacillus typhosus, when injected into the general circulation of animals, soon disappeared from the blood and found lodgement in various organs, particularly the liver, spleen, and bone-marrow. These observations led to the general view that the typhoid bacillus entered the general circulation only rarely and very quickly disappeared.

Subsequent bacteriological researches have shown that this view is incorrect, and that typhoid septicæmia is comparatively common. The early negative results were due to the failure to recognize the germicidal properties of the blood. The cultures were made with undiluted blood, and the concentrated bactericidal substances contained in it prevented the growth of the bacilli. Kühnau was the first to take this property of the blood into consideration in making blood cultures in typhoid. He diluted the blood in 50 c.c. of bouillon and immediately plated. His report in 1897 gave eleven positive results during life in forty-one cases.

Cole (*Johns Hopkins Hospital Bulletin*, July 1901, p. 203), by a slight modification of the technique, has obtained even better results. From 8 to 10 c.c. of blood is obtained from one of the veins at the elbow after thorough disinfection of the part. No incision of the skin is made. The blood is immediately diluted in bouillon contained in Erlenmeyer flasks, about 150 c.c. of bouillon being used in each flask. From one to six such flasks were used for each culture, the dilution being from 1 : 75 to 1 : 150. The flasks were then well shaken and placed in an incubator for twenty-four hours, after which, if the bouillon were cloudy, agar plates were made. The organism was identified by its usual characteristics, including its property of agglutination with typhoid blood-serum. With this technique a positive result could be obtained in thirty-six hours.

Cultures were made in fifteen cases of typhoid, with positive results in eleven, which is a large percentage. The earliest day on which the organism was isolated was the sixth. In five cases the blood cultures were positive before the Widal test was obtained. The latest positive result was on the twenty-seventh day. Schottmüller reports having obtained positive results in forty out of fifty cases, and Unger in seven out of ten cases.

The importance of the taking of blood cultures in typhoid, considering these results and the fact that the Widal reaction is delayed in many cases, cannot be over-estimated in making a diagnosis of the disease.

Two Examples of Bence-Jones' Albumosuria Associated with Multiple Myelomata. A Preliminary Report.—Hamburger (*Johns Hopkins Hospital Bulletin*, February, 1901, p. 39) reports two cases in which the urine was shown to contain the so-called Bence-Jones bodies. In one case there was strong evidence and in the other positive evidence of the existence of

multiple myelomata of the bones. The chemical reactions of the urine, which are characteristic of the presence of the Bence-Jones bodies, were practically identical in both cases, and the same description will serve for both. Heated to a temperature of 55° to 56° C. a heavy white precipitate fell. This redissolved in part on boiling and returned on cooling. Nitric acid caused a heavy ring which disappeared on boiling and also returned on cooling. The biuret reaction was marked. The proteid content in both cases was fairly high. In one case Esbach's albuminometer showed 0.27 per cent., and in the other from 0.3 to 0.6 per cent. In one case the proteid substances were precipitated with ammonium sulphate, and the precipitate was washed with water. The filtrate gave a definite biuret reaction, thus demonstrating the albumose character of these bodies.

The first case was in a woman, aged forty-nine years, a patient of Dr. Iglehart. The latter found that the urine presented reactions which differed from those presented by albumen. On analyzing the urine Hamburger recognized the reactions as being those characteristic of the Bence-Jones bodies, and suggested that the patient probably had some bone affection. It was then recollected that the patient had suffered intense pain over the left ninth rib. Subsequently the appreciable swelling appeared on this rib near the costo-chondral junction.

The second case was a colored woman, aged fifty years, who was under treatment in the medical wards of the Johns Hopkins Hospital while the first case was under observation. For a year she had suffered pain in the region of the right hip-joint. On admission there was a tumor the size of a child's head in this situation. There were tumors of the left acromion process, both clavicles, and one the size of an orange over the occiput. This patient eventually died, and at the autopsy multiple myelomata were found in the above situations. The histological report of the tumors is not given in this paper.

The Bence Jones bodies, which give the chemical reactions noted above, were first described by Henry Bence-Jones in 1847. The association of the reactions with changes in the bones was noted by him in this first case. The patient died, and Bence-Jones states that on " the following day I saw that the bony structure of the ribs was cut with the greatest ease, and the bodies of the vertebræ were capable of being sliced off with a knife." The condition was designated post-mortem as " osteomalacia fragilis rubra."

During the fifty years following Bence-Jones' observation only four cases of albumosuria associated with primary bone disease appeared in the literature. In the past three years eight additional cases have been recorded. In eight of the thirteen cases the autopsy disclosed neoplasms which could be classified as myelomata. In two cases the tumor was visible. In the remainder there was no record of a post-mortem inspection. The cases of Fitz and Askanazy are not included in this list. Fitz's case occurred in a woman with myxœdema, and Askanazy's in a patient with lymphatic leukæmia.

The exact nature of the Bence-Jones bodies has not been accurately determined. They are believed to be very closely related to but not identical with albumose. The origin of the proteid is also obscure. It has been found isolated both from the blood and bone-marrow.

The nature of the bone tumor is discussed at considerable length. The name "multiple myeloma" was first applied to the tumor by Rustizy. The tumor does not correspond to the usual conception of malignant neoplasms in the Cohnheim sense, owing to the fact that they probably never metastasize. In the gross these tumors form masses of soft reddish tissue of various sizes, often ill-defined, replacing the normal marrow and osseous substance. The sternum, ribs, vertebræ, and skull are especially prone to the affection. The tumors may or may not appear on the exterior. The bones become softened and are apt to suffer pathological fractures. Many of these cases are mistaken for osteomalacia, but albumosuria has never been found in the latter disease, so that the examination of the urine practically suffices to differentiate the diseases. Histologically in a majority of instances the structure of the tumor has been that of a round-celled sarcoma. Wright, who studied a myeloma in detail in connection with Fitz's case, found that the tumor elements consisted of a variety of plasma cells and believed that they originated in the plasma cell of the bone-marrow.

Dr. Welch, in discussing Hamburger's paper, drew attention to Wright's work as being the most recent contribution to the pathological anatomy of multiple myelomata. The myelomata were not to be considered tumors in Cohnheim's sense, and the nodules are not to be regarded as metastatic tumors secondary to a primary one. If future observations show that the tumor cells are predominantly plasma cells, as found by Wright, the tumors will belong to the class of new growths first designated by Unna as plasmomata.

The Relation of Diabetes Mellitus to Lesions of the Pancreas. Hyaline Degeneration of the Islands of Langerhaus.—OPIE (*The Journal of Experimental Medicine*, March 25, 1901, vol. v., No. 5, p. 527) refers to a previous paper of his, which has already been reviewed in this department, in which he strongly suspected as a result of a study of a series of cases of chronic interstitial pancreatitis that where diabetes mellitus existed with this lesion, it was due to degenerative changes in the islands of Langerhaus. In the present paper he reports the study of a case of diabetes mellitus in which the pathological findings were such that we can now say with certainty that cases of pancreatic diabetes are due to lesions of the islands of Langerhaus embedded in the gland.

The patient was a colored woman, aged fifty-four years, in whom symptoms of tuberculosis began to manifest themselves about eleven months before her death. Several months afterward symptoms of diabetes mellitus manifested themselves. On admission to the Johns Hopkins Hospital she was found to be suffering from advanced pulmonary tuberculosis, and the urine contained from 4 to 5.4 per cent. of sugar. The patient died several days after admission.

At the autopsy advanced pulmonary tuberculosis was found. The liver, spleen, and kidneys showed nothing of especial note. The brain was removed and found to be normal.

The pancreas weighed 80 grammes and measured 23 x 5 x 1 cm. It was readily dissected from the surrounding tissues. It was soft in consistence, and on section had a gray-yellow color. Histological study of the gland

showed no generalized increase of the interstitial tissue, but here and there, particularly in the tail of the organ, the fibrous stroma showed some proliferation. The normal secretory glandular epithelium was practically normal, beyond some small areas where post-mortem digestion had occurred. In striking contrast, however, was the condition of the islands of Langerhaus. These showed most extensive hyaline degeneration. Only rarely was an island found in an unaltered condition. Some islands showed only partial destruction, while many showed complete destruction by the degenerative process. The hyaline metamorphosis was limited strictly to the islands of Langerhaus, the glandular acini remaining intact. In specimens stained in eosin the islands stand out very conspicuously, as the hyaline material takes a deep eosin stain.

Opie discusses hyaline degeneration at length from a pathological standpoint, and refers in detail to the staining properties of hyaline material.

The writer considers this case of great importance from the stand-point of etiology and pathology of pancreatic diabetes. In his previous study he had endeavored to demonstrate that in diseases of the pancreas associated with diabetes mellitus the islands of Langerhaus were always seriously involved. In the present case which he reports there was no demonstrable pathological lesion outside the pancreas to which the diabetes could be attributed. Even in the gross the pancreas looked practically normal, but microscopic examination demonstrated that the pathological lesions were absolutely localized in the islands of Langerhaus.

Opie's concluding words briefly sum up our latest knowledge concerning pancreatic diabetes toward which he has contributed such valuable information. He says: "Destruction of the pancreas in animals and in man is accompanied by diabetes; in the present case destruction of the islands of Langerhaus has been accompanied by this disease. Since diabetes is absent, when as a result of duct destruction, the secreting portion of the gland undergoes great alteration, though the islands are spared, the conclusion is justified that it is those structures which influence carbohydrate metabolism. What has been learned concerning the action of the pancreas to diabetes is the relation of the islands of Langerhaus to this disease."

The Pathology of Active Tuberculosis of the Pericardium.—WELLS (*Journal of the American Medical Association*, May 15, 1901, p. 1451) has made a careful study of tuberculosis of the pericardium, the work being based on the examination of ten cases which occurred in a total of 1048 autopsies performed at Cook County Hospital.

The writer emphasizes the point that pericardial tuberculosis is not nearly so uncommon as generally supposed. It occurs in about 1 per cent. of his series. Of the 1048 autopsies, 364 presented distinct tuberculous lesions elsewhere than in the pericardium, of which 208 were active. In all the bodies with active tuberculosis, therefore, about 5 per cent. presented active tuberculous lesions in the pericardium. In the entire series the pericardium was found affected in some way in 128 cases; of these, the ten cases of tuberculous pericarditis constitute nearly 8 per cent. Tuberculous pericarditis is very likely to occur in the young.

Anatomically tuberculous pericarditis may occur (1) as an acute miliary

eruption on the pericardium, with a serous or hemorrhagic exudate; (2) in the form of a miliary eruption, but of a more chronic type, accompanied by fibrous synechiæ, but without effusion; (3) as a definite caseous process. The best pathologists and clinicians agree that a sanguineous effusion points strongly toward tuberculosis, although the effusion in malignant processes is also liable to be hemorrhagic. The myocardium may be involved secondarily or primarily, the former being the more common.

Wells challenges the view that there is a primary tuberculosis of the pericardium. He thinks that there is always a primary focus elsewhere in the body. The possible methods of infection of the pericardium are (1) Hæmatogenous, generally in the course of a miliary tuberculosis. (2) Lymphogenous, the bacilli coming through the lymph vessels either in the normal direction or with a reversed current. (3) Extension, in about the order of frequency, from mediastinal glands, pleura, myocardium, and vertebræ.

Infection of the pericardium is considered much more common by way of the lymph stream than by the bloodvessels. Tuberculosis of lymphatic origin is generally most marked on the parietal pericardium; that of hæmatogenous origin affects most often the epicardium. From the pleura direct extension may occur as well as by the lymphatics. It is probable, however, that direct extension from the pleura, as from the lymph glands, is not so common as lymphatic transmission.

Wells states that there is no doubt but that tuberculosis of the pericardium may heal entirely. The disease may lead to the production of synechiæ and of the condition of adherent pericardium. He states that adhesion of the pericardial layer seems much less likely to cause serious cardiac disturbance when due to tuberculosis than when due to rheumatism.

The myocardium may be affected in two ways: by a fibrous interstitial process, or by direct growth of the tubercles into the heart walls. The interstitial myocarditis is much less extensive and serious than that which follows rheumatism. Myocardial tuberculosis may occur in several forms: 1. Miliary tubercles, generally in miliary tuberculosis. 2. Large tubercles, usually multiple, and at times reaching the size of a hen's egg. 3. Diffuse tuberculosis, extending through a considerable part of the myocardium, chiefly as fibrous tissue intermingled with nodular and caseous tuberculosis, very rare. 4. Interstitial myocarditis, with occasional tubercles scattered about in the fibrous tissue without caseation, also rare. A myocardial tuberculosis may heal. The condition of cardio-tuberculous cirrhosis of the liver occasionally occurs in tuberculous pericarditis. The lesions consist generally of a diffuse fibrous increase plus miliary or small nodular tubercles, but sometimes only diffuse sclerotic changes or fatty cirrhosis without tubercles.

As to the termination of tuberculous pericarditis healing is considered possible. Healing occurs only in cases that are subacute or chronic from the start. Wells states that while calcification of a tuberculous exudate is possible he has been unable to find a well-authenticated case in which this calcification has been shown to originate on a basis of tuberculosis. Death is the most usual termination. It may be due to interference with the heart in the stage of effusion, but usually it is due to the associated tuberculous lesions of other viscera. Tuberculous pericarditis is generally unaccompanied by any symptoms referable to the heart, and is almost always an autopsy finding.

SURGERY.

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The Treatment of Joint Tuberculosis.—HILDEBRAND (*Correspondenz-Blatt*, January 15, 1901) states that the ideal aim in the treatment of joint tuberculosis is to eradicate the disease, and thus enable the joint to resume its normal functions. The remedy sure to accomplish all of this remains to be discovered. Many cases have proven that joint tuberculosis can be cured, but with impaired function. Nature accomplishes this either by replacing the tuberculous infected tissue with connective tissue, or else encapsulating it, and so preventing further extension of the disease. The functional result is most varied, depending upon which of these two processes has taken place. Treatment, then, should be directed toward either eradicating or encapsulating the area of disease. This can be accomplished by the direct irritation of the tuberculous area by means of chemicals, or indirectly by gradually destroying the tuberculous focus by artificially increasing the motion of the surrounding healthy tissue, and so causing the formation of connective tissue. Lastly, by the mechanical removal of all the area of infection. The method of choice in each case depends upon a series of factors which have nothing to do with the patient's disease.

The treatment should be different in the cases of adults and those who are still growing; and, still further, it varies as to whether the synovial membrane or the bone is involved. The differential diagnosis between the synovial and osteal forms is extremely difficult, but the radiograph will be found of much assistance in all cases. Patients who have not yet reached their full growth should always be treated by the conservative method, which is generally followed by a good result. This treatment consists in complete fixation of the affected joint by means of appropriate bandages, so that there may be every opportunity for the synovial membrane to so unite that the area of infection becomes encapsulated. Experience has shown that the injection of iodoform is most beneficial, especially in children, and that it is the best of all the drugs recommended for the local treatment of tuberculosis. Another drug that should be mentioned is formalin, which acts as a caustic, destroying the tuberculous tissue and bacilli and promoting the formation of healthy granulations. These injections are painful, but its use has been beneficial in many cases. This form of treatment is only of benefit when the synovial membrane is alone involved. In the osteal form of the disease, especially where necrosis has taken place, it is of

no value. The method of Bier, which is the production of venous engorgement of the affected area, has proved efficient in many of these bone cases. In some few cases the intravenous injection of hetol has proved to be a successful method of treatment experimentally. It produces around the tuberculous area an infiltration of leucocytes and dilatation of the capillaries, which is followed by the formation of connective tissue rich in nuclei. The author has tried this method in thirty-five cases, but in not one did there seem to be any improvement. It is, of course, only applicable to the synovial form of the disease. After these treatments have been given a fair trial and failed, arthrectomy is to be considered, but it is only admissible in certain joints. It should not be performed in the case of children where the knee is involved, because of the disturbance of growth which of necessity follows. It is but seldom indicated in the cases of involvement of the hand, elbow, and foot, but it is indicated in coxalgia, and in tuberculosis of the acetabulum and ileum. In marked cases of coxalgia, where there has been much destruction of tissue, resection is the best operation. In all cases of joint tuberculosis amputation is but rarely to be considered. The treatment of joint tuberculosis in adults is very different from that of children, for one has not to consider the question of future growth, and so radical operations can often be considered at once. It is usually best not to experiment too long with conservative methods of treatment, but just as soon as pus has formed, when fistulæ have appeared, when mixed infection has occurred, resection should be performed. It is indicated in every joint, there being no exception to this as there are in the cases of children. This operative treatment has given splendid results—70 to 80 per cent. are cured permanently. This treatment should, of course, have the adjuncts of good air (mountain or sea), good food, an out-of-door life, and, internally, creosote and guaiacol. The estimation of the results of the different treatments of joint tuberculosis is very difficult, for in those cases which are cured by non-operative methods of treatment there is often a question as to whether or not the diagnosis was correct. Hydrops articuli and synovitis have sometimes been diagnosed as tuberculosis, and experience has shown that it is only by operative treatment that the diagnosis can be positively made.

Urotropin.—SUTER (*Correspondenz-Blatt*, January 15, 1901) states that urotropin is the product of the combination of formaldehyde and ammonia. It is a white, crystalline, hydroscopic powder, easily soluble in water. Experiments have shown that a portion of urotropin is broken up by the acid contents of the stomach into its constituents, while the rest passes out into the intestines, there to be absorbed. It is best to give urotropin upon an empty stomach, so as not to have it come in contact with the acid of digestion, but best of all would be to give the urotropin in capsules, so that it would pass undecomposed into the intestines, there to be broken up and absorbed. In order to determine the efficacy of urotropin as an antiseptic in the various forms of infection of the urinary passages, the author experimented with the following bacteria: staphylococcus pyogenes albus and aureus, streptococcus pyogenes, bacillus typhosus, bacillus coli communis, proteus Hauser, and the bacillus aërogenes lactis. As a result it was found that the typhoid bacillus, colon bacillus, and bacillus aërogenes lactis

seemed to possess greater power of resistance than did the proteus Hauser and the pyogenic cocci. Further experiments showed that urotropin is by far the strongest of any of the urinary antiseptics. Urotropin should be administered some hours before the passage of sounds or catheters, so as to render the urine antiseptic and to minimize the dangers of infection, and its use is also indicated before any operation on the bladder or prostate. Urotropin is valuable in the treatment of certain forms of cystitis, but it is important to remember that in many cases the bladder wall is more or less extensively involved, and it is in this class of cases that the action of urotropin will be slow. Experience has shown that urotropin is of practically no value in tuberculosis of the bladder and gonorrhœal cystitis. It has, however, been found to be particularly serviceable in those cases of cystitis due to infection of the prostate, prostatic hypertrophy, or urethral stricture, in which there is retention, especially so in those cases where the reaction of the urine is acid.

Enlargement of the Inguinal Glands in Cancer of the Rectum.—VIANNAY (*Gaz. Hebdom. de Méd. et de Chir.*, February 24, 1901) states that enlargement of the inguinal glands in cancer of the rectum is rare, but reports two cases in detail to show that it may occur. In one of the author's cases it was the first symptom of a latent cancer of the rectum. The enlargement of the glands may be due to a simply inflammatory process, while, on the other hand, it may be the result of the presence of the cancer cells in the glands. In those cases where the glands are involved and operation is decided upon, the artificial anus should be established on the same side as the involved glands, and where both sides are involved it is best to establish it in the median line.

A Contribution to the Study of Hæmothorax.—TUFFIER and MILIAN (*Rev. de Chir.*, April 10, 1901) state in conclusion that the increase in volume of the effusion, which is marked toward the fifteenth day, is not due to the continuation of the hemorrhage, but to the exudation of serum. It is easy to show by exploratory puncture that the fluid is clear. This increase of the effusion should not be considered an indication to operate. Moderate fever, especially when of non-bacterial origin, but only due to the absorption of the exudate, is also not an indication for operative interference. The persistence of polynuclear leucocytes after the twenty-fifth day is a very positive indication that suppuration has occurred. A differential count should be made each day, and the polynuclear leucocytes should always be fewer in number than the lymphocytes and mononuclear leucocytes. The best treatment of traumatic hæmothorax is by capillary puncture, which should be performed about the fifteenth day, when the wound of the lung is sufficiently cicatrized, so that there need be no fear of a new hemorrhage beginning as soon as the injured lung is relieved from the pressure of the exudate.

Urotropin as a Urinary Antiseptic.—CAMMIDGE (*Lancet*, London, January 19, 1901) states that the effects of urotropin on the urine of a normal individual are absolutely *nil*. It has no diuretic action, and does not cause any appreciable change in the excretion of the urine's chemical constituents.

It was found in the urine ten minutes after the first dose was administered, and it still continued to be excreted in small quantities twenty-six hours after the administration had been discontinued. As a rule, urotropin is well borne, though some patients may have an idiosyncrasy toward it. All investigators are agreed that much of the urotropin taken by the mouth is passed unchanged; but there is considerable divergence of opinion as to whether the antiseptic properties of the urine are due to the drug itself or to some decomposition product arising from it. As the result of chemical experiments with the bacillus typhosus, bacillus coli communis, and the staphylococcus pyogenes aureus the author found: 1. Urotropin alone may, by prolonged heating, be made to yield formaldehyde, but that this decomposition does not take place at body temperature. 2. An alkaline solution of urotropin may be similarly decomposed, but that the body temperature is not sufficient to cause the change. 3. Dilute acids quickly decompose urotropin on boiling, with the evolution of free formaldehyde, and that this change occurs to a less degree at 37° C. 4. Acid salts—*e. g.*, of the urine—liberate formaldehyde from urotropin in boiling, but not at 37° C. 5. The acid urine of a person taking thirty grains of urotropin a day does not contain free formaldehyde. As a urinary antiseptic urotropin appears to be much superior to those usually employed, such as salol, ammonium benzoate, boric acid, guaiacol, naphtalin, and resorcin, especially when the acidity of the urine is ensured by suitable measures. It is not, however, only as a curative agent in the ordinary forms of urinary infection that the advantages of the drug are so apparent, but in typhoid fever it may be employed from the third or fourth week onward to the advantage both of the patient and the community at large. Recent researches have shown that typhoid bacilli occur much more frequently in the urine than has been generally supposed, and that they may persist for very long periods. After convalescence in one case they were found five years later. By the systematic use of urotropin in all cases the real danger from this source, which is so frequently overlooked, may be entirely avoided.

Calculus of the Prostate.—PASTEAU (*Annales de Mal. de Organ. Genito-urinaire*, April, 1901) after reviewing the subject in detail states in conclusion that it is important to distinguish between (1) the urinary calculus that may develop in the prostatic urethra or its diverticulæ, or that may descend from the upper part of the urinary tract and finally lodge in the prostatic urethra; and (2) the true intraglandular calculus of the prostate, whose development has been attributed to an attenuated infection of the gland. This last form is very much rarer than the urinary calculus.

A Report of Seven Operations for Brain Tumors and Cysts.—HOPPE (*Journal of the American Medical Association*, February 2, 1901) states that the early wave of enthusiasm which followed the brilliant successes of Macewen, Godley, Horsley and Keen has been gradually displaced by an amount of pessimism which is unwarranted by the cumulative results of brain surgery for tumors and cysts. The pendulum has swung too far to the side of non-interference. This has been the direct result of numerous unwarranted operations in cases of suspected brain tumor, or in cases where the tumor was

not accurately located. The author feels safe in saying that hundreds of such cases, at a very low estimate, have been operated upon, which will never be spread on the annals of surgery or neurology. These are the cases which have done great damage and have been the cause of the pessimism which prevails, not only among the profession at large, but, what is far worse, among the laity, who are only too apt to remember the failures and forget the successes, especially if the former outnumber the latter.

It is true that the enthusiastic hopes and predictions of the early enthusiasts have not been verified, but the fact remains that the field for brain surgery for tumors and cysts, although very much narrowed, is still a considerable one, and one in which relief can be given and much good done. Pessimism always leads to inactivity and nihilism. Many a life could be prolonged, made more comfortable, and even saved, if the general practitioner and the general public once more felt the confidence born of successful results obtained in well-selected cases. Even in the latter, the mortality will always be great on account of the unwillingness of patients to be operated upon in the early stages; but if we consider that with the extremely rare exceptions all cases of brain tumor are fatal, even the large mortality will not deter us from not only advising but urging operations. It would seem too much to hope that the history of cancer operations might be repeated in brain surgery, but the principle is the same, and the success might be equally brilliant if, as in cancers, operations are done early on well-selected cases. In this way we may hope that the confidence of the general practitioner and of the public will be restored.

The author reports the following seven cases:

Case I.—Male, aged thirty-two years. First symptom, Jacksonian epilepsy; local symptoms, Jacksonian epilepsy of left arm and leg; general symptoms, general convulsion, headache, and vertigo; optic disk negative; operation, trephining; seat of tumor was in right foot and arm centre; result, hemiplegia, epilepsy; still living after seven years.

Case II.—Male, aged eighteen years. First symptom, hemianopsia; local symptoms, total blindness; general symptoms, headache, vertigo, and nausea; optic disk pale; operation, trephining; seat of tumor was in left occipital lobe; result, recovery of sight; still alive after seven years.

Case III.—Male, aged twenty-two years. First symptom, Jacksonian epilepsy; local symptoms, epilepsy, epileptic insanity; general symptoms, none; optic disk negative; operation, trephining; seat of tumor, cyst over right leg centre; result, improvement for six months, and died after one year.

Case IV.—Male, aged ten years. First symptom, spastic paralysis of left arm; local symptoms, spastic hemiplegia; general symptoms, headache, apathy; optic disk choked; operation, trephining; seat of tumor in subcortical motor area of right side; result, died in four hours from shock.

Case V.—Male, aged forty-six years. First symptom, sensory aphasia; local symptoms, sensory aphasia; general symptoms, headache and mental confusion; optic disk negative; operation, trephining; seat of tumor, cyst of first temporal sphenoidal lobe of left side; result, much improved for sensory aphasia, and still living.

Case VI.—Male, aged thirty-two years. First symptom, numbness and weakness of left leg; local symptoms, Jacksonian epilepsy, hemiplegia, and

diplegia; general symptoms, headache, vertigo, and apathy; optic disk choked; operation, trephining; seat of tumor was in right foot centre; result, died from shock in four hours.

Case VII.—Male, aged twenty-three years. First symptom, general epilepsy; local symptoms, spastic hemiplegia; general symptoms, coma and convulsions; optic disk negative; operation, trephining; seat of tumor, multiple cysts; result, died from cerebral hemorrhage.

The following are the conclusions which most authorities have come to as a result of the observation of their own cases and the study of the literature on the subject: 1. Tumors of the cortex or subcortical region of any portion of the cerebral hemispheres which can be reached through the calvarium are operable. 2. If possible the operation should be performed early, when the tumor is small; but even large tumors and those infiltrating in character have been operated on with success. 3. A study of the successful cases shows that, with few exceptions, brain surgery is limited to the psychomotor areas (von Bergmann). 4. The result of surgical interference, even in the most successful cases, rarely leads to complete recovery. The general symptoms due to intracranial pressure disappear, but the focal symptoms, viz., the epileptic seizures and paralysis, either remain permanently or are only diminished. It must not be forgotten, however, that the life of the individual has been saved. 5. Cerebellar tumors are inoperable. This is the law laid down by Oppenheim and concurred in by Bergmann. Those of the posterior and upper surface of the cerebellum, near the lower margin of the occipital lobe, have been removed, but the operation has been invariably fatal (Oppenheim). The danger is due to the crowding of large sinuses into a small field of operation and the pressure upon and displacement of the medulla. Occasionally a cyst has been luckily tapped, but we can never localize with certainty, and we all know how disastrous exploratory operations are in this region. 6. The cumulative experience of all writers is against the exploratory operation. 7. Shall we advise palliative operations? On this subject authority is divided. Horsley, Bramwell, Annandale, Sanger, Sahli, Sinking, Keen, Bruns, and perhaps Oppenheim are in favor of palliative operations for the relief of violent symptoms of increased intracranial pressure in rare cases. Von Bergmann and Von Braman are against it. The author's limited experience in cases in which he refused to advise an operation and the operation was, nevertheless, performed, has been with those who oppose the operation. 8. The author does not agree with Oppenheim that gummata should not be operated on. He has in his possession the brain of a man who refused to be operated upon which shows that the gumma could have been removed successfully. This gumma was located accurately and diagnosed as such in the arm centre during life. In his opinion tubercles, if isolated and located so as to be operable, should be operated upon, other things being favorable. Metastatic carcinomata are inoperable.

The Rontgen Rays and the Diagnosis of Urinary Calculi.—MOULLIN (*Lancet*, London, January 19, 1901) states that unless there is some unusual difficulty, such as an abnormally short abdomen or an extreme lumbodorsal curvature, displacing and burying the kidney, the Röntgen rays can be relied

upon to give definite and accurate information not only as to the existence of a calculus, but as to its size, its exact position, and, what is even more important, whether there are other calculi present either in the same or in some other part of the urinary tract. The best results are obtained with calculi composed of oxalate of lime. If no calculus is shown after a second examination, repeated under varying conditions, it may be taken as certain that there is no calculus there. In many instances Röntgen photography is the only method by which the presence of a fixed calculus can be ascertained. Under ordinary circumstances the Röntgen rays are not required in cases of vesical calculus. The diagnosis can usually be made with the sound, but in those cases associated with enlargement of the prostate this method fails completely, and the Röntgen photograph is absolutely essential in order to make the diagnosis. In making skiagraphs of the kidneys it is best to firmly apply a bandage over that portion of the trunk so as to restrict as much as possible the movements of the kidneys during breathing. Unless everything is certain a second examination should be made after a few days' interval, and, if there is any doubt, then a separate exposure should be taken of the area in question, a leaden plate with a circular opening exactly opposite the anode being interposed between the tube and the patient, so as to cut off as far as possible all extraneous rays and obtain a better defined shadow.

The Indications for and Limitations of Spinal Cocainization in Surgery.—FOWLER (*Medical Review of Reviews*, April 25, 1901) states that as the result of his experience he believes that this method has a place in surgery. The author has employed it in operations upon the legs, region of the knee, thigh and groin, extraperitoneal operations in the pelvic region, including the perineum and anorectal region; intraperitoneal operations in the pelvic region; abdominal section; for the radical cure of inguinal hernia; upon the abdominal wall; renal region, and upon the thorax. All of the cases were entirely successful. The author states in conclusion that this method is applicable to a large number of operations. It is simple, easy, and without danger. It involves a very small loss of time, does away with at least one skilled assistant, the anæsthetizer, and will permit of the performance of many operations, with the help of nurses, or even of strictly non-professional persons alone, as in emergencies, war surgery, etc. No contraindications to its use in the areas in which it is applicable have as yet developed, save those pertaining to the mental state of the patient and purely æsthetic considerations. Of these latter the operator in the case must be the judge, and come to a conclusion as to the choice between the employment of a general anæsthetic and subarachnoid lumbar cocainization. The patient's own wishes in the matter should not be ignored, since, under certain circumstances, his morale may be so interfered with as to lead to serious psychic disturbances.

The Treatment of Recent Luxation of the Peroneus Tendons.—REERINK (*Centralblatt für Chir*, January 12, 1901) reports the interesting case of a man who slipped on attempting to mount his horse, and so produced a dislocation of the peroneus tendons of the left leg. Examination soon after

the accident showed that immediate reduction was impossible owing to the great swelling of the region of the external malleolus. Six days later, the swelling having subsided, the dislocated tendons were reduced, and maintained in position by strips of adhesive plaster 1½ cm. wide and from 6 to 8 cm. long. These strips were very lightly applied, and four days later were covered in by a thick gypsum bandage. This bandage was worn for five weeks, when it was removed and the foot massaged daily for several weeks, when all treatment was stopped. Examination showed that the result was perfect, the tendons were in their proper position, and moved in a normal manner. When seen six months later there was no sign of any relapse or weakness in this leg.

Hysterical Tympany, Laparotomy, Relapse.—LONDE and MONOD (*Gaz. Hebdom. de Med. et de Chir.*, February 28, 1901) report the case of a man, aged thirty-three years, who presented himself with a large tympanitic abdomen. Examination showed that there was no ascites; that palpation was not painful except in the region of the liver; that the lungs were normal; that there was indigestion and cramp-like pains after eating; some slight dilatation of the stomach, but the bowels were regular. Examination of the nervous system showed that there was total anæsthesia of the left side, but no disturbance of motion. The patient complained of persistent headache, but vision was normal. The patient's general condition was excellent, appetite good, no fever, and a normal pulse. A laparotomy was performed in 1896, the diagnosis then being tubercular peritonitis, the only symptom at that time being marked tympany. Soon after this operation the abdomen returned to its normal size, and the patient believed himself to be completely cured, but three months later the pain reappeared and the abdomen again became tympanitic. A second laparotomy was performed in 1898, and was followed by a second period of apparent cure, but four months later the old symptoms reappeared, and have continued so ever since. This case is undoubtedly one of general hysterical tympany.

Luxation of the Median Nerve.—DEPAGE (*Annales de la Soc. Belge de Chir.*, December, 1900) reports the interesting case of a boy, aged fourteen years, who three months before his entrance to the hospital sustained a luxation of the right elbow. As the result of this accident there was an absolute loss of power of the forearm and of the hand and insensibility of the external portion of the latter. Luxation was reduced immediately. Soon after the dressings were removed motion returned to the forearm, but the paralysis and insensibility persisted. Examination showed that there was no atrophy, that there was no deformity at the elbow, and that the articular movements were intact. The muscles supplied by the median nerve were paralyzed, the nerve presented a total absence of electrical reaction, and a loss of sensibility of all that portion of the hand supplied by the median nerve. Believing that the median nerve was being pressed upon by scar tissue, the author proceeded to operate. An incision was made over the internal border of the biceps muscle and followed down until a large nerve was exposed in the upper part of the incision, which by its size and its relations resembled the median. This nerve was closely connected with the mass of fibrous tissue

which was dissected away, and after searching in vain in the lower portion of the incision for the median nerve the wound was closed with sutures. This operation was followed by such slight benefit that another operation was decided upon. This consisted in an incision 8 cm. long behind the olecranon. The ulnar nerve was discovered retracted to the inner side, while the median nerve was found behind the epitrochlear, incased in a mass of connective tissue, and separated from the ulnar nerve by a small amount of fibrous tissue which seemed to be the inner muscular aponeurosis. The median nerve was dissected out and returned to its normal position. As a result of this second intervention the sensibility remained abolished to the extremities of the index and middle fingers, while in the thumb and the palm of the hand it remained normal. There is much more motion in the hands than formerly. Willems, in discussing this case, stated that he had seen two somewhat similar cases in which the trophic lesion followed a dislocation of the shoulder. One case terminated in complete atrophy of the arm, and was twice operated upon; the first time the axillary plexus was exposed, while the second time the roots of the plexus in the subclavicular triangle were exposed, but careful examination revealed absolutely nothing.

Some Errors in Diagnosis in Conditions Resembling Appendicitis.—BREWER (*Annals of Surgery*, May, 1901) states in conclusion, after a careful analysis of eleven cases, that renal calculi may produce pain, simulating that produced by lesions of the appendix or the biliary passages, and are often unaccompanied by classical signs such as hæmaturia, vesical irritation, and tenderness in the lumbar region. Occasionally small stones may be overlooked after inspection and palpation of a kidney through a lumbar incision. Cysts of the right ovary or parovarian, when strangulated by a twisted pedicle, may often present symptoms which closely simulate an acute appendicitis. A twisted hydrosalpinx may simulate the same disease.

It is well known that cholecystitis and appendicitis are extremely hard to differentiate. The negative results of palpation of the region of the pancreas through the walls of the stomach or the tissues of the omentum by no means exclude an acute suppurative process in that organ; the presence of small, white areas of fat necrosis generally distributed over the peritoneal surfaces should immediately direct our attention to the pancreas, and also that the local condition or the general sepsis caused by this lesion may give rise to symptoms and signs strongly simulating those produced by a general infection of the greater peritoneal sac. A rapidly growing sarcoma of the small intestine is often mistaken for acute appendicitis, and in the early stages of their development these growths produce no obstruction, and often give rise to no discomfort. Severe general sepsis, from infected foci entirely removed from the abdominal cavity, may often give rise to symptoms and signs identical with those produced by a local or general peritonitis.

The Treatment of Malignant Tumors by the Anticellular Serum of Wlaeff.—REYNIER (*La Presse Méd.*, February 16, 1901) reports two interesting cases treated by this method. The serum is obtained as the result of the inoculation of birds with the pathogenic blastomycetes, yeast cells, isolated from the cancerous tumors of the human being. The first case was

a marked one of cancer of the tongue, who came for operation, but careful examination showed the condition to be inoperable. Medical treatment was advised, but the patient's condition became steadily worse; he had terrible hemorrhages and excruciating pain, deglutition was almost impossible, and the tongue was ulcerated and adhesive to the floor of the mouth. The right axillary and cervical glands were of enormous size, and, on the whole, his condition was extremely bad. At this time the injection of the serum was begun and repeated at frequent intervals. After the first injection the pain disappeared, sleep became possible, the tongue decreased in size, and deglutition was easily performed. After ten injections the patient was so much improved that he was able to attend to his business. There was a cessation of the steady loss of weight, and the patient could speak, which was impossible before the beginning of the treatment. The enlarged glands decreased somewhat in size, and the condition of the tongue was improved. The second case was that of a woman with cancer of the breast, who also improved under this treatment. The tremor diminished markedly in size, but ultimately it was removed by operation. On microscopical examination it proved to be a cylindrical epithelioma. The serum of Wlaëff has an evident action upon neoplasms, as has been proved in many cases, but this action is not radical, and, furthermore, it is not lasting, for experience has shown that when one ceases the injections the tumor at once begins to grow and extend. This serum will never replace operative interference.

PEDIATRICS.

UNDER THE CHARGE OF

LOUIS STARR, M.D.,
OF PHILADELPHIA,

AND

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Death due to Hypertrophy of the Thymus.—TAILLENS (*Revue Médicale de la Suisse Romande*, June 20, 1901, p. 345) sums up his conclusions of a study under this title as follows:

1. In certain cases hypertrophy of the thymus can be a cause of death.

2. The mechanism of this accident varies as it follows the convulsive form, producing sudden death by action on the heart, or the compressive form, which acts slowly by asphyxiation.

3. In the convulsive form treatment is useless since the symptoms occur so rapidly that there is no time to act. In the compressive form medical treatment is useless, and even intubation or tracheotomy has proven futile. The only case definitely diagnosticated and cured by operative procedure—Siegel's—suggests a rational plan of treatment of this form (opening of anterior mediastinum and suture of the gland to the substernal fascia).

4. The pathological importance of hypertrophy of the thymus may be very considerable, especially in legal medicine, in which death has been wrongly attributed to negligence or criminal intent. (Cases cited by Grawitz and Ramoino.) It is possible that in rare cases the thymus may be at fault when death is attributed to goitre, or in some cases in which it is impossible to dispense with the tube after tracheotomy.

5. The expression thymic asthma does not seem to the author to be exact. The rapid convulsive form would be better designated under the name of cardiac death, or sudden death, due to the thymus, while the slow asphyxic form should be designated as thymic tracheostenosis. These two designations would serve to emphasize the difference between the two forms and their different mechanisms, as well as to prevent the classification under the name thymic asthma of a number of affections which have nothing in common with the thymus gland.

The Diazo Reaction in Diphtheria.—LOBLIGEOIS (*Revue mensuelle des Maladies de l' Enfance*, June, 1901, p. 270) has made a careful investigation of this sign in the urine of 118 cases of diphtheria, confirmed by bacteriological examination, among patients under treatment at the Hôpital Trousseau in the service of Guinon. The urine was examined every day from admission to discharge from the hospital in each case. In control cases it was found that the use of the antitoxic serum had no influence upon the appearance of the reaction, and could be neglected altogether in the results.

According to RIVIER (*Thèse de Paris*, 1898), who has collected forty-four cases in which the presence or absence of this reaction had been recorded, only five positive results had been observed by seven competent authorities (Ehrlich, Escherich, Feer, Nissen, and others). The author's observations in the much larger series lead him to believe that the frequency of recurrence of the diazo reaction is even less than these figures would indicate, since he found it only in five cases out of his 118, from which four, he thinks, should be eliminated for various reasons: two, in which the patients coincidently suffered from scarlatina; one, in which the reaction was positive only on the day of death, the child dying in convulsions from bronchopneumonia, and a fourth, in which the diazo reaction was positive for four consecutive days while the child presented an intense scarlatiniform erythema which was probably a true scarlatina. This, therefore, shows but one instance of positive reaction in 114 cases of diphtheria which were not accompanied by another known infectious malady.

In ten cases the color was a bright red, but on agitation the foam was orange-colored and not rose, and, therefore, could not be accepted as positive. In most of these cases the color persisted only for a day, three times only for a second day. Four times it coincided with a serum erythema; once the child was affected with pneumonia, and once there was a concomitant pleurisy. In the four cases in which the coloration lasted for a day coincident with a serum eruption, it was never characteristically positive. Since then examinations of the urine of seven or eight cases during the serum erythema has yielded negative results.

This latter observation offers an important diagnostic sign. Not infrequently the diagnosis between a scarlatiniform erythema due to serum and

a true scarlatina is extremely difficult, since scarlatina often complicates diphtheria. Clinically the eruptions are very similar, and the throat may be quite red in both diseases. Under these conditions the presence or absence of the diazo reaction offers valuable aid in the diagnosis. In twelve cases showing the serum exanthem the diazo reaction was absent. In scarlatina Brewing found it present in three out of six cases; Nissen, in eleven out of twenty-three in the first days of the disease, and Rivier in twelve out of twenty-six. These figures appear to be lower than the author's experience would indicate, for he has found the reaction present in eight out of eleven cases of one series and in all of seven cases of a second series, the test having been made upon cases of scarlatina in full eruption. Altogether, the diazo reaction has been found positive in scarlatina in twenty-six out of fifty-five cases of other observers, and in fifteen out of eighteen in his own researches. He, therefore, considers the diazo reaction as an important diagnostic sign between scarlatina and the scarlatiniform erythema due to serum. If the reaction is positive, scarlatina may be affirmed; if negative, there is strong presumption against scarlatina.

The same conclusion would be justified, in the absence of other signs, for the diagnosis between an antitoxin rash and measles, in the latter of which the diazo reaction has been found positive seventy-five times out of eighty-five, according to the authors cited by Rivier.

Value of the Widal Reaction in Infancy.—JOHN LOVETT MORSE (*Archives of Pediatrics*, May, 1901) concludes that in early infancy a positive Widal reaction is of somewhat less diagnostic value than in older children and adults. If the mother has had typhoid, and especially if she is nursing the infant, it should be looked on with some suspicion, unless associated with other characteristic signs of typhoid. Examination of the mother's blood and milk and the cessation of breast feeding will then assist in estimating the true value of the reaction in the infant.

Malaria in Children.—WM. A. NORTHRIDGE (*Brooklyn Medical Journal*, April, 1901, p. 175) states that the four most important symptoms of malaria in the child are fever, periodicity, anæmia, and enlarged spleen. The first three of these symptoms are always present; the enlargement of the spleen is also constant, but cannot always be detected. In acute cases the enlargement may not be discovered because it diminishes rapidly after the paroxysm is over. The quotidian is by far the most common type of the disease in the young child. Of the 576 cases upon which the study is based, 456 were quotidian, 84 tertian, 7 double quotidian, and 17 remittent. In 3 the paroxysm recurred upon the seventh day; 1 was quartan, 3 were recorded as "dumb ague," and 5 as cases of chronic malarial poisoning. He believes that the feeble resisting power of the infant accounts for the frequency of the quotidian type, rather than the double infection theory of Thayer. The double quotidian type is quite rare, and of the 7 cases recorded all were in very young children, the oldest of whom was only two years of age. A curious association of types occurred in a breast-fed baby, aged fifteen months, and its mother, the child having a quartan type while the mother was ill with the tertian variety.

The chill occurs in the young child with somewhat more relative frequency than is commonly supposed, according to the author's statistics. Of 504 cases below the age of five years, 25, or about 1 in every 20 cases, were ushered in with a chill; 27 were taken ill with a convulsion. Chill occurred in 1 case each at four months, eight months, and ten months of age; in 4 cases between one and two years; in 6 cases between two and three years; in 5 cases between three and four years, and in 7 cases between four and five years. Thus the fact is emphasized that the older the child the more apt it is to have a well-marked chill.

Convulsions occurred in 27 of the 504 cases below five years of age, and of this number 23 were between six months and three years, while the remaining 4 were between three and six years of age, showing that the older the child the less apt is a convulsion to occur. Fifteen of the 23 cases were in children below the age of two years, and 7 were in infants below the age of thirteen months, so that the tendency to convulsions is about equally strong for each of the first three years of life.

In the ordinary type of the disease the symptoms are, in the main, convulsions, a cold, pale face, nausea and vomiting, feeble pulse, trembling taking the place of a chill, and followed by high fever and great anæmia. Often the clinical diagnosis must be made on the periodical return of a high fever with or without the presence of an enlarged spleen, all other symptoms being absent. Malarial torticollis was found in eight cases and malarial chorea in ten cases. Diarrhœa of periodic type occurred in ten cases.

Repeated Lumbar Puncture in Cerebro-spinal Meningitis.—KOPLIK (*Medical News*, 1891, No. 1471) reports a series of five cases of cerebro-spinal meningitis due to the meningococcus, in which repeated lumbar puncture was practised. Fifteen punctures in all were made, as early as the fifth and as late as the thirty-seventh day of the disease. Four of the five cases recovered, the fatal case occurring in an infant, aged eight months.

The indications for puncture were continuous headache, accompanied by somnolence and delirium, chills, sharp rise in temperature, increase in opisthotonos, and coma. If improvement followed puncture the operation was repeated as the symptoms increased again in severity.

The benefit of this plan of treatment seems to lie in a diminution of pain and a reduction of the symptoms due to toxæmia and mechanical pressure. The withdrawal of an appreciable amount of fluid from the spinal canal which contains bacteria and the toxic products of inflammation must be beneficial, in the long run, on the course of the disease. As a curative method it seems destined to rank with aspiration of the pleural cavity.

A French View of Infantile Scurvy.—Rather remarkable conclusions in regard to the etiology and pathology of infantile scurvy as observed in France are given in a recent Paris thesis by PAUGAM (*Contribution à l'étude de la maladie de Barlow en France*, Paris, 1901). According to this author the disease is very rare in France, and results from the use of milk modified in various ways and especially "maternized milk" (seven out of eleven cases). Sterilized milk, he states, does not come under the title of a modified milk. The disease has no definite clinical picture, and the grave hemorrhagic form

often described by foreign writers is exceedingly rare. Scurvy always occurs, in this writer's opinion, in patients with rhachitis, either evident or latent—a theory that can no longer be accepted for American cases, at least.

Clinical, anatomo-pathological, and pathogenic study of this syndrome leads the author to conclude that Barlow's disease is a form of rhachitis, an exaggeration of the congestive process of rickets with hemorrhagic tendencies.

The prophylactic treatment of rickets is to be instituted; modified milks and alimentary specialties are to be avoided.

In case of existent disease a well-ordered alimentary regimen makes the symptoms disappear. Antiscorbutic remedies are only adjuvants, and do not constitute a specific medication.

[Infantile scurvy is so well understood by both American and English writers that comment on this author's conclusions seems unnecessary.—ED.]

Prophylactic Injections of Diphtheria Antitoxin.—At a recent meeting of the Société de Pédiatrie (Séance, June 11, 1901; *Revue mensuelle des Maladies de l'Enfance*, July, 1901, p. 335) AUSSET discussed this question and declared himself in favor of it. He cited the case of a family in which diphtheria developed. Of two other children one was sent to the country, the other, an infant, aged eleven months, nursed by his mother, received a prophylactic injection of serum. This child escaped the disease, while the one who had been sent away developed diphtheritic angina complicated by a suppurative otitis. The speaker was convinced that the attack would have been avoided had a preventive injection been given.

BARBIER was also in favor of such injections in families in which diphtheria was declared, but since the time of immunity is uncertain it is important to keep such children under observation for some time.

NETTER had collected 32,484 observations of prophylactic injections. Of this number it was noted that, after elimination of the cases in which the disease developed in less than twenty-four hours after the injection, or more than thirty days after, there were 192 cases in which diphtheria developed in spite of the preventive injection—a proportion of 6 per cent. of failures.

On the other hand, Netter has recently made ninety preventive injections, with two failures—a proportion of 2.17 per cent.; while of twenty-five children simply isolated without receiving the serum, three developed the disease—a proportion of 12 per cent.

COMBY and SEVESTRE also testified to the value of prophylactic injections in controlling the spread of the disease. In terminating the discussion the following resolution was adopted:

The Société de Pédiatrie affirms that preventive inoculations present no serious dangers and confer immunity in the great majority of cases for some weeks. It recommends their employment in children's institutions and in families where scientific surveillance cannot be exercised.

Leucocytosis in Measles.—RENAUD in a recent thesis (*La leucocytose dans la rougeole*, Thèse de Lausanne, Paris, 1900) presents interesting conclusions as to the condition of the blood during the activity of the measles infection.

Fourteen days before the appearance of the exanthem the blood is normal, which corresponds with what might be expected at the moment or even just before the beginning of the incubative stage.

During the incubative period there begins a relative as well as absolute increase in the polynuclear leucocytes, with an absolute increase, though relative decrease, of the lymphocytes. In one observation, for example, the number of leucocytes was 16,200 above the normal, and of this number 13,268 belonged to the polynuclear group, the remainder to the lymphocytes. As the lymphocytes formed only 21 per cent. of the leucocytes, it is evident that during the period of incubation the increase of leucocytes is especially due to the polynuclear group.

This pre-eruptive hyperleucocytosis commences at the beginning of the period of incubation, increases rapidly, and reaches its maximum about the sixth day before the appearance of the eruption, but from this time on it diminishes.

Examination of the blood during the period of the enanthem shows that in normal cases there now occurs a fall in the proportion of the polynuclears, while in those cases which are or will be complicated by another affection this fall is not observed. This fact is of decided importance in the prognosis.

At the same time that, during the enanthem in normal cases, the polynuclear neutrophiles diminish, myeloplaques appear, and there is a slight increase in the lymphocytes.

The eruptive stage is characterized by hypoleucocytosis due to a constant diminution, absolute and relative, of the polynuclears, with increase (sometimes relative only) of lymphocytes and myeloplaques. The eosinophiles disappear. This hypoleucocytosis generally reaches its maximum on the second day, about twenty-four hours after the beginning of this period. The number of leucocytes is then reduced about half, and this is at the expense of the polynuclear neutrophiles. From this point, however, leucocytosis increases more or less rapidly after the disappearance of the exanthem, reaching its normal level from one to five days (generally the second) after the disappearance of the rash, provided no complications interfere.

In complicated cases, however, with the general increase there is also an increase, absolute and relative, in the polynuclears; the absolute number of lymphocytes also increases, but less markedly. In these cases the myeloplaques remain in the blood, and numerous eosinophiles appear. Finally, during the post-eruptive period if there are complications there is a hyperleucocytosis, the increase depending upon the polynuclears, which sometimes are alone responsible for it.

These modifications in the elements of the blood are of considerable importance in both diagnosis and prognosis. Quite recently Meunier has called attention to a symptom of the incubative stage which he calls the "premorbillous loss," and which consists in a diminution of weight of about 50 grammes per day, beginning on the fourth or fifth day after infection, and reaching a total of about 300 grammes. An examination of the blood at this time, therefore, furnishes another early diagnostic sign, which is at least as important as that of Meunier. This sign, as already indicated, is a hyperleucocytosis which begins with the infection, and increases rapidly, reaching a maximum eight or nine days before the appearance of the exan-

them, and, therefore, four or five days before the period of contagiousness. If this phenomenon of hyperleucocytosis be sought for among children who have been exposed to the contagion, a diagnosis may be made during the incubative stage and before the case becomes infective to others, thus permitting of early isolation and stamping out of the epidemic.

In differential diagnosis during the period of the exanthem, when the rash may be mistaken for various toxic infections or drug eruptions, it must be remembered that none of these affections is accompanied by hypoleucocytosis, or even that increase in the number of white corpuscles is to be observed, the exanthem following injection of antidiphtheritic serum, for example, being accompanied by a polynuclear hyperleucocytosis. The diagnosis from urticaria or syphilitic roseola may be clinically very difficult, but these affections are not accompanied by hypoleucocytosis. It is only in rare cases that the diagnosis of measles from scarlatina may be difficult, but, according to hæmatologists (among them Türck) who have studied the latter disease, there is a hyperleucocytosis, with increase of eosinophiles—a phenomenon quite the reverse of that observed in the eruptive stage of measles.

As an aid to prognosis, it has been shown that in the eruptive period a slight hypoleucocytosis which rapidly changes to a hyperleucocytosis is an indication of a present or approaching complication. This reaction is very delicate, since so slight a complication as a panaris, a conjunctivitis, or a simple bronchitis is announced by a more or less considerable increase in the leucocytes. In grave complications, such as suppurative otitis, bronchopneumonia, or tuberculosis, this hyperleucocytosis is very marked. During the period of desquamation, when naturally the leucocytosis returns to normal, the hyperleucocytosis of complications persists as long as the organism is able to resist. Rapid fall in the count at such a time is of grave import, as is also the continuance of the hypoleucocytosis, in the presence of a complication, after the time that a return to a normal count should be expected.

It may be added that this law does not apply to affections normally accompanied by hyperleucocytosis, such as typhoid, malaria, and acute and generalized septicæmia, which, however, are extremely rare complications of measles.

THERAPEUTICS.

UNDER THE CHARGE OF

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Diuretic Action of Caffeine and Theobromine.—DR. HENRI ANTEN, in an extended research on the kidney functions relative to diuretics, and more particularly limited to the study of the xanthin diuretics (caffeine and theo-

bromine), gives the following general conclusions: 1. Uric acid and probably urea also are for the greater part, if not exclusively, excreted by the epithelium of the convoluted tubules of the ascending loop of Henle. 2. Caffeine can, under certain conditions, act as a diuretic in the dog. Its habitual inactivity in this animal may be considered to be an evidence of the inhibitory action which the vagus has over the renal secretion, and which action is exaggerated by the use of caffeine. 3. Irritation of the vagus, in the neck, or in the cardiac region suspends the renal secretory action, not, as Walravens maintains, by an arrest of the heart's action, nor yet as Masius supposes, and as Corin seems to admit, by vaso-constrictive action, but such suppression is due to a direct action exercised on the secretory tissue of the kidney. 4. Theobromine acts as a diuretic in the dog. 5. The xanthin diuretics, in contradistinction to the saline diuretics, which at the same time, while stimulating the action of the liver and kidney, also stimulate the secretion of the lymph, do not possess any lymph stimulating action. 6. There does not seem to exist any relationship between the degree of solubility, the character of dissolution, and the diuretic activity of the xanthin bodies. This is a view contrary to that held by Von Aubel and by Corin. 7. The xanthin diuretics are direct stimulants of the renal epithelium. Contrasted with the saline diuretics, which seem to be able at the same time to increase the elimination of water and also of salts, especially of the chlorides, the xanthin diuretics seem to favor the elimination of nitrogenous substances, notably urea and uric acid. Inasmuch as these are secreted by means of the epithelium of the convoluted tubules, the xanthin diuretics, therefore, act more particularly on the epithelium.—*Archives Internationelles de Pharmacodynamie et de Therapie*, 1901, vol. viii. p. 455.

Santonin in Locomotor Ataxia.—Dr. E. Negro has found that santonin in three doses of five grains at three-hour intervals in eleven patients experimented on gave relief in eight, temporarily relieved two, and did not affect one. The routine of giving ten grains as an initial dose and five grains five hours later was adopted. The santonin was administered in the crises only. The pain was relieved in from two to three hours after the initial dosage, and disappeared entirely after a further dose.—*Giornale della Reale Accademia di Medicina di Torino*, 1901, vol. xvii. p. 47.

Intramuscular Injections of Calomel for Gonorrhœal Rheumatism.—Dr. M. Thomas, in a short note, after reciting many of the disappointments in methods used to treat (so-called) gonorrhœal rheumatism, advocates the employment of intramuscular injections of calomel. He has amplified the method of Gorsse, and injects into the body of the larger muscles one-half grain of calomel at intervals of from two to four days. He has not encountered any disadvantageous symptoms. As yet the method has had but limited practical application.—*Le Mois Thérapeutique*, 1901, vol. ii. p. 59.

Sodium Cacodylate in Tuberculosis.—Dr. Paul de Langenhagen reports on the use of this drug, which, by means of its greatly diminished toxicity, permitted of the use of large doses of arsenic, in eight instances of pulmonary tuberculosis. In four of the patients the symptoms indicated a

slight involvement only. These showed symptoms of improvement within three to four months. In three of the patients in whom cavity formation, fever, and loss of flesh and strength were extreme, the fever diminished, the pulmonary condition was much improved, and in five months there was marked gain in weight. In one patient *in extremis* the result was negative. —*Hospitalstidende*, 1901, vol. viii. p. 1169.

Phthisis Treated with Duotal.—Dr. H. Holsti reports on the use of duotal in eleven patients in the clinic at Helsingfors. In the beginning of the treatment the doses were eight grains thrice daily. Later these doses were reduced, so that one and one-half grains were administered, with gradual increase in dosage. In one instance only was there any change for the better in the general condition of the patient. This, however, was not more marked than in many other patients placed under hygienic treatment. In those cases in which dyspeptic symptoms were prominent, the use of duotal was distinctly disadvantageous. The author's conclusion is that the remedy is worthless for phthisis.—*Finska läk. handlung*, 1901, vol. xlii. p. 1080.

Zomotherapy in Phthisis.—Dr. L. Robinson considers in detail some of the work of Robin and Binet on respiratory exchange, and brings into prominence the investigations of Richet and Héricourt on the use of raw meat (zomotherapy) in the treatment of tuberculosis. These investigators have shown that cooked meat is very different from raw meat, and that meat deprived of its serum is of but mediocre value, and that muscle serum is as efficacious as the raw meat from which it is expressed. The muscle serum, it is claimed, is antitoxic to the toxin of the tubercle bacillus.—*The Practitioner*, 1901, vol. lxvii. p. 102.

[The hypotheses discussed are ingenious but fragmentary.—R. W. W.]

Lupus and Urea.—Dr. A. H. Buck, following the suggestion of Harper that urea was useful in the treatment of tuberculosis, has tried this remedy in lupus with satisfactory results. The disease commenced at the age of twenty-four, at first in the upper lip and side of the nose. After ten years the lesion was so extensive that operation was deemed inexpedient. After twelve years, the time of the beginning of the use of urea, the patient was horribly disfigured, little of the normal contour of the face being intact. In March of the present year urea in twenty-grain doses was given thrice daily. This dose was increased to thirty and forty and even to sixty grains thrice daily. Healing of the ulcers soon commenced, and reparation was soon well advanced almost to completion. Two months later the nodules had entirely disappeared, the discharge from the nasal cavity had ceased, and all acute manifestations had subsided.—*The Practitioner*, 1901, vol. lxvii. p. 140.

[The history of this case is distinctly noteworthy, and continued experimentation along this line is desirable.—R. W. W.]

Antityphoid Serum.—Dr. E. W. Ainley Walker contributes an important series of observations bearing on the experimental side of the question of the value of antityphoid serum. Ehrlich was perhaps the first observer to clearly enunciate the proposition that a difference in the species

between the animal immunized and the animal to be protected or cured formed a barrier to success of the gravest importance in the production of antityphoid, antistreptococcic, antipneumococcic, and other antimicrobic serums. Certain important facts are well established which lend much support to this view, yet it is not by any means certain that the difficulties are to be attributed to the differences of the species. In the study of the different serums certain fundamental distinctions of the character of the etiological factor should constantly be borne in mind. Again, different animals vary in their susceptibility to any given organism, and it is evident that the serum of a less susceptible animal artificially immunized against that organism will be less protective than that of a more susceptible animal brought to the same degree of immunization. The author has set out to show just what these variations are, and to point out, if possible, what factors are concerned in the phenomenon of immunity. He brings out clearly the necessity of recognizing the differences between an antimicrobial and an antitoxic serum. The former has a bactericidal action, the latter none. The former also may have antitoxic power—that is, as far as the anticholeraic serum is concerned. With reference to the antityphoid serum the evidence is not as convincing. The author states, however, that there is sufficient evidence to show: 1. That such a serum can be obtained by immunizing horses against the bacillus typhosus. 2. The initial stages of the process may be shortened by using the method of Bokenham. 3. A high degree of immunization must be obtained, and the employment of living cultures in the later stages is desirable. 4. The serum must be made widely polyvalent by the use of as many and as largely different races of typhoid bacilli as is practicable. 5. The relative value of the serum obtained may be determined by a determination of its relative agglutinative power. 6. It is open to question whether the efficiency of the serum might not be further increased by immunization of the horses against *bacillus coli communis* also, or by the addition to the serum of a certain proportion of anticoli serum from a horse treated with that organism.—*Journal of Pathology and Bacteriology*, 1901, vol. vii. p. 250.

Intestinal Lithiasis.—Dr. Louis Vibert discusses the occurrence of this affection under two forms: 1. Those forms of calculi which do not originate within the intestinal canal, such as pancreatic or biliary calculi, grains and seeds of fruit, débris of food, calculi derived from fistulas of the bladder or vagina, and, rarely, medicinal powder concretions, chalk, etc. 2. Those originating in the intestinal canal, existing either in the form of intestinal sand or as well-matured calculi. Treatment should be directed toward curing the actual attack as well as toward preventing the recurrence of the trouble. As colic is the most pressing symptom calling for relief, here hot water applications externally with opiates and belladonna are indicated. Enteroclysis is also called for. As far as prophylaxis is concerned dietetic regulation is paramount. Constipation should be regulated, vegetables interdicted, as they seem to form the nucleus for the sand or calculi, and intestinal antiseptics, such as beta-naphtol, administered regularly. Mineral waters are advised, particularly those rich in magnesium chloride. Such are Chatel-Guyon, Vichy, and Vittel.—*Revue de Thérapeutique*, 1901, vol. lxviii. p. 397.

Treatment of Typhoid Fever.—Dr. James Stewart reports typhoid fever treated in the Royal Victoria Hospital, Montreal, for the seven years since its opening to the present. During this time six hundred and twenty patients suffering from typhoid were admitted, of whom thirty-four died, an average of 5.4 per cent. Of these, eleven died from perforation, ten from intoxication, and nine from hemorrhage. Cholecystitis, bronchopneumonia, septic pyæmia, and abdominal distention each caused one death. Since the opening of the hospital the routine treatment has been hydrotherapy save in a few contraindicated cases. The first bath administered is at a temperature cooled from 90° to 80° F. for ten minutes. The second is at a temperature of from 85° to 75° for a similar period; and the third is at the same temperature for fifteen minutes. The fourth and subsequent baths are given at 80° F., quickly lowered to 70° F. for a period of fifteen minutes. The usual precautions relative to friction, etc., are taken. The bath is given every third hour while the temperature is above 102.4° F. Bathing was resorted to throughout the entire course of the disease in 83 per cent. of the cases.—*British Medical Journal*, 1901, No. 2111, p. 1463.

[The frequency of perforation in typhoid fever when treated by hydrotherapy is emphasized by almost every series of cases. If the modern theory of hydrotherapy is correct ten deaths from intoxication point either to incorrect or inefficient practice. Even this mortality is altogether too high. —R. W. W.]

Cinnamon in Influenza.—Dr. J. C. Ross concludes, after a careful series of observations made during the past five years, that cinnamon if used promptly and thoroughly will cure most cases of influenza in a comparatively short time. Decoction of cinnamon or "tabloids" of it are recommended as desirable forms to take the remedy. The dosage is not given.—*British Medical Journal*, 1901, No. 2110, p. 1403.

Hæmaturia following the Use of Urotropin.—Dr. W. Langdon Brown reports two cases of hæmaturia resulting from the use of urotropin in which doses of ten grains thrice daily were given. Both occurred in subjects with typhoid fever. In the first case a male, aged thirty-three years, was given ten grains thrice daily for two days. The patient was then probably ill some weeks. Two days after beginning medication pain and difficulty in micturition were observed, and hæmaturia with scanty urine became established. Cessation of the drug was followed by the clearing up of the urine. In the second instance, a patient, aged twenty-four years, was in the second or third week of typhoid, but had been in bed but two days. Ten grains of urotropin were given thrice daily, and the next day blood appeared in the urine. Withdrawal of the drug was followed by a cessation of symptoms. Discomfort on urination is noted as a danger signal. The complication is recorded as an interesting though probably not a common condition.—*British Medical Journal*, 1901, No. 2111, p. 1472.

Fatal Sulphonal Poisoning.—Dr. Henry Waldo reports the instance of a male, aged thirty-three years, without occupation, who fancied he was a bad sleeper and had acquired a habit of taking hypnotics, chiefly sul-

phonal. He developed a peculiar condition of delirium, with pain and tenderness over the abdomen, nausea, vomiting, and constipation. A few days from the onset of his illness the urine became cherry-red and smelling like celery. The spectroscope showed the presence of hæmatoporphyrin. The patient gradually failed, became demented, resembling the terminal stage of paresis, and finally died with general convulsions, which were epileptic-like in character. In all, the patient was ill about twenty-four days—ten days with gastritic irritability and two weeks with cerebro-spinal symptoms and progressive toxic paresis.—*British Medical Journal*, 1901, No. 2111, p. 1473.

OBSTETRICS.

UNDER THE CHARGE OF

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Eclampsia and the Thyroid Gland.—NICHOLSON, of Edinburgh, recently read a paper upon this subject before the Edinburgh Obstetrical Society, published in full in the *Scottish Medical and Surgical Journal*, June, 1901. The discussion upon the paper appears in the *Scottish Medical and Surgical Journal*, July, 1901. In the paper the author discusses the changes in the blood and circulation during pregnancy, drawing attention to the fact that there is always a toxæmia as the result of fœtal metabolism. There is during pregnancy increased vascular tension, due to hypertrophy of the cardiac muscle and the muscular coat of the vessels. Each pregnant patient, especially in her first pregnancy, is in a condition of toxæmia where the balance is easily disturbed and a dangerous condition might readily arise.

He believes that there is an intimate relation between inadequate function of the thyroid gland and the mechanism which arrests the renal secretion. During pregnancy hypertrophy of the thyroid is usual. In twenty-five pregnancies in which the usual hypertrophy was absent Lange found albuminuria in twenty. Thyroidin has a marked diuretic effect, but does not greatly diminish albuminuria. The writer cited the case of a multipara who had eclamptic convulsions and who was cured by the administration of thyroid, going to term and giving birth to a healthy living child. He drew attention to the fact that when the thyroid does not perform its function urea is not properly formed, and the action of the kidneys is deficient. He thought that eclampsia often resulted from substances produced in the liver which form in that organ because the thyroid does not act properly.

In treating eclampsia and the pre-eclamptic state by thyroid extract he would give five-grain doses night and morning, and after a few days three times daily. Proteid food should be entirely forbidden at first and very gradually resumed. When signs of eclampsia appear and a fit seems

imminent, ten or fifteen minims of thyroid liquid should be injected hypodermically every hour or two. The fresh juice of a sheep's thyroid, ten minims with an equal quantity of distilled water, is more efficient. For the immediate treatment of the convulsion he would give one-half grain of morphine. He thought well of saline transfusion in connection with thyroid and morphine.

In the discussion of the paper Underhill remarked that if thyroid deficiency were the cause eclampsia should be seen more frequently. The thyroid theory did not account for the frequency of eclampsia in primiparæ. Hart recalled the cases of two myxœdematous women who had borne children and who had no eclampsia. On the contrary, they actually improved in condition during their pregnancy, probably owing to the action of the fœtal thyroid. He also reported experiments made on bitches in removing the thyroid while they were pregnant. Hart did not believe that the thyroid theory was sufficient to account for eclampsia. Haultain thought the most important point in the paper was that regarding increased arterial tension. Whatever causes eclampsia does so by bringing about this abnormal tension. Iodothyrin should be given a fair trial, as it may be found efficient in counteracting the effect of the toxins and dilating the vessels. Ballantyne stated that the last case of eclampsia narrated in the paper was under his own care. The apparent effect of the thyroid in this case was striking. He had found it a difficult matter to decide whether the thyroid was enlarged or not during pregnancy. In the Edinburgh Maternity Hospital the number of cases of eclampsia was remarkably large.

Bacteria in the Feces of Newborn Infants.—Hellström publishes in the *Archiv für Gynäkologie*, 1901, Band lxiii., Heft 3, the results of interesting studies in the clinic at Helsingfors regarding the presence of bacteria in the feces of newborn infants. From his studies he concludes that the bacillus coli communis and lactic bacterium develop rapidly and freely in the infant's intestines during the first days after birth. This is possible, because there is in the intestine at this time a greater quantity of material on which these germs can live, and the acid reaction of the feces has not yet become established. After the fourth day the number of bacteria steadily decreases. Many of the germs seen upon examining such specimens are dead bacteria which have been in the intestine during intra-uterine life. They are the colon bacillus and the lactic bacillus.

Sterilization of the Hands and Puerperal Morbidity.—Sticher (*Zeitschrift für Geburtshülfe und Gynäkologie*, 1901, Band xlv., Heft 3) reports the results which he has observed in the Breslau clinic in sterilizing the hands and the results obtained from various methods upon the puerperal morbidity of the clinic. He describes in detail the antiseptic methods of the clinic, which do not differ essentially from those in common use. Vaginal examinations are limited as much as possible; green soap, bichloride, and lysol are plentifully used, and the technique is that commonly seen in all well-managed clinics. He used sterile gloves for some time in the work of the clinic, but did not observe that their introduction was followed by any special improvement in the course of cases. He finds that such operations

as manual removal of the placenta, rapid delivery which tears the cervix; difficult labor attended by extensive lacerations, and in general such operations as bruise and wound the tissues are followed, in spite of antiseptic precautions, by some elevation of temperature. It is evident to him that not only is the sterility of hands and instruments of importance, but in a large percentage of cases in which the temperature rises the patient herself contains within her body the cause of the fever. He draws attention to the many opportunities for the introduction of bacteria into the genital canal through bathing, the passage of urine, the giving of rectal injections, vaginal examinations although the fingers be sterile, and infected amniotic liquid.

It is his experience that preliminary cleansing of the genital tract should be limited to cases in which a pathological process is evidently present. In sound and healthy women whose secretions are presumably healthy he does not practice such interference.

A competent obstetric antisepsis obliges the practitioner not only to be aseptic in his hands and instruments, but also to study carefully each patient to detect a septic condition in the genital canal. Obstetric operations should be so conducted as to produce the least possible traumatism.

Bacteriological Examination of the Contents of Pemphigus Vesicles in the Newborn.—A further contribution to the pathology of infancy is made from the Helsingfors clinic by BERGHOLM (*Archiv für Gynäkologie*, 1901, Band lxiii., Heft 3.) He made culture examinations of the contents of pemphigus vesicles in cases of disease in the newborn. He readily obtained numerous bacteria, diplococci in chains. Of these he made cultures and inoculated mice with the cultures. Most of the animals died as the result of the inoculation, but one developed an eruption upon the skin. He reviews the various examinations which have been made, adding his own report to them.

The Second Stage of Placental Development.—VAN TUSSENBROEK, of Amsterdam, describes (*Zeitschrift für Geburtshülfe und Gynäkologie*, 1901, Band xlv., Heft 3) a uterus in early pregnancy obtained by operation, in which the development of the placenta was studied. From this examination it is concluded that the development of the placenta, from the primitive to the discoid form, is complete at the sixth month of pregnancy. The uterine decidua has entirely disappeared at this time, as the result of mechanical pressure. The villi are obliterated by the disappearance of the intervillous spaces between the chorion and uterine decidua. The circulation of the embryo does not come into actual contact with the chorion. The placenta is spread out as it grows through the mobility and change in the uterine decidua. When this disappears and the chorion joins with the ovular decidua, the placental decidua grows at the same rate as that of the uterine wall. The cotyledons of the placenta are formed by the superficial layer of the placental decidua as it expands under an unequal resistance, which is greatest near the bloodvessels. This brings the small vessels to the apex of the villi, and results in the arrangement seen in the circulation. The trophoblast can be plainly distinguished from the decidua. Langhan's layer has disappeared, its cells mixing with those of the syncytium.

Pregnancy and Ventral Fixation.—In the *American Journal of Obstetrics*, July, 1901, DICKINSON contributes a paper upon this subject, and reviews its literature.

His first case was that of a multipara who had ventral fixation, shortening of the round ligaments with plastic operation upon the vagina. At labor a tumor was said to obstruct delivery, and version and perhaps embryotomy were done. After the patient had been septic for three weeks she was sent to Dickinson's service at the hospital. She then had peritonitis with extensive exudate surrounding a laceration on the right side, the rent in the uterus running from the external os to the cornu, and splitting the broad ligament. The fundus was fixed to a scar above the pubes, the posterior wall was thin and relaxed. The anterior wall was two inches thick, and ran from the top of the scar half-way back across the pelvis. The patient did not rally.

His second patient was a delicate woman, who had ventral suspension and removal of a cyst from the ovary. Conception occurred shortly after marriage, and the patient suffered from nausea and toxæmia. On examination the right horn of the uterus was thrown forward, and the vaginal portion of the cervix was in front of the promontory. As the patient did not come into labor spontaneously, she was anæsthetized and examined, when the left ovary and round ligament were found at Poupart's ligament. The external os was found crowded against the middle of the first sacral vertebra. An effort was made to pull down the cervix and to bring on labor by dilating the os. It was impossible to reach the internal os, and dilators could not be inserted. Cæsarean section was performed and the mother delivered of living twins. The mother died of shock twelve hours after the operation.

The Treatment of Pruritus Vulvæ.—SIEBOURG (*Centralblatt für Gynäkologie*, 1901, No. 26) has treated cases of pruritus vulvæ by the application of an ointment of cocaine, orthoform, menthol, carbolic acid, and vaseline, with good results in some cases. He has used all of the substances recommended and with varying success. In the most intractable cases he has had good results by injecting sterile salt solution in the vicinity of the parts and also by using cold applications and subcutaneous injections of dilute solutions of cocaine and carbolic acid. In using salt solution one-third of a quart was injected, and sufficient distention of the tissues produced to raise the skin from the underlying tissue to a considerable extent. He has succeeded in this way in curing some intractable cases.

Latent Infection of the Endometrium in Pregnancy, Causing Puerperal Septic Infection.—ALBERT, from the Dresden clinic, contributes a very interesting and important paper upon this subject in the *Archiv für Gynäkologie*, 1901, Band lxiii., Heft 3. He reports two cases, as follows:

The first was a primipara, seven months advanced. Labor pains came on, followed by chill, fever, and the discharge of foul amniotic liquid. These phenomena were repeated, and the patient became eclamptic. She died undelivered. Post-mortem examination showed an area of infection at the fundus of the uterus, with the formation of pus separating the membranes from the wall of the womb. The placenta was infiltrated with pus, and the

wall of the uterus unchanged. The phenomena of general septic infection were found throughout the body. The original focus could not be discovered. Cultures were not taken, but a streptococcus mixed infection was undoubtedly present.

His second case was a primipara near term, brought to the hospital in labor, with the history of feeling ill and depressed for a number of days, and having had several chills. A midwife had made one examination just before admission. Labor proceeded spontaneously, and a dead child was soon born. The patient died of acute sepsis forty-two hours after admission. Upon autopsy abscess in the wall of the uterus, septic infection of the tubes and ovaries, and general sepsis were found.

Albert reviews the literature relating to the condition of the genital tract as regards the presence of bacteria, and from his cases and from the literature concludes as follows: Bacteria are found in the vagina in all cases in health as well as in disease. When any form of bacteria known to be pathogenic is discovered, the patient must be regarded as infected. At any time in life, especially after the beginning of menstruation, the cervix and cavity of the uterus may become infected. In many cases this infection is brief and mild, and during a latent infection of the mucous membrane of the uterus conception may occur. Many abortions and premature labors followed by septic phenomena are due to this condition. Adhesion of the placenta, nephritis, and, in some cases, eclampsia may be referred to such infection. As ordinarily carried out, our prophylaxis of puerperal fever begins too late to be effective.

As prophylactic measures of value, he suggests the use of clothing which shall entirely cover the vulva and prevent entrance of germs during the motions of the patient. Abnormal discharges from the genital canal, attended with abnormalities of menstruation, should receive attention. During pregnancy we should correct abnormal discharges as far as possible, if necessary putting the patient in bed for this purpose. The same antiseptic precautions should be observed in private houses during labor which are carried out in hospitals. In the puerperal period the patient should be kept at rest sufficiently long to enable her to thoroughly recover with a well-contracted uterus. She should be so placed in bed as to further drainage of the lochial discharge. Care should be taken that retroflexion of the uterus does not occur, which will favor the retention of the secretion.

To the foregoing the reviewer adds the case of a multipara eight months advanced in pregnancy, who had a periodical discharge of fluid from the uterus. She was admitted to the hospital when labor came on, and a premature child was spontaneously born, and survived. The mother had a mild septic infection, from which she readily recovered after the uterus was thoroughly cleansed.

On examining the placenta and membranes septic infection of considerable duration was found to have been present before labor. Several varieties of bacteria were isolated from the membranes, and cultures made. Microscopical study of the specimens showed the characteristic phenomena of infection.

There was no evidence of syphilis or of gonorrhœa. The patient lived amid poor surroundings, worked hard, and was poorly nourished.

The Influence Upon the Fœtus of the Maternal Treatment of Syphilis.—In the *Wiener klinische Wochenschrift*, 1901, No. 26, RIEHL contributes a paper upon the treatment of syphilis in the pregnant patient with the results of such treatment upon mother and child. He quotes the statistics of various writers, which show a mortality for the fœtus where the mother is not treated of nearly 100 per cent. Where treatment is carried out through several weeks the fœtal mortality falls to 97 per cent., and where maternal treatment is continued during months but 76 per cent. of children are lost. Ordinary syphilis in the pregnant woman is treated by mercurial inunction, by mercury given by the stomach, and by iodide of potassium.

With a view of influencing the fœtus and checking syphilitic changes in the uterus, Riehl treated a number of syphilitic pregnant patients by vaginal capsules containing fifteen grains of mercurial ointment with cocoa butter. These capsules were kept in place by a tampon of cotton or gauze. He continued in many cases the ordinary treatment of syphilis. Whenever possible he made this the only treatment. He describes the case of a woman who became syphilitic and aborted twice, and had the characteristic lesions. Under the treatment described she passed through pregnancy and gave birth to a normal child. In all he treated by this method thirty-three patients, with the result of abortion in 3 per cent.; premature labor in 9 per cent., and labor at full term in 88 per cent. Of the children, 6 per cent. were still-born; 6 per cent. were syphilitic, and 88 per cent. were apparently healthy. The total fœtal mortality was 12 per cent., and the total fœtal morbidity was 21 per cent.

Three Cæsarean Sections in the Same Patient.—COAKLEY (*Journal of the American Medical Association*, June 29, 1901) reports three Cæsarean sections upon a patient having a contracted pelvis whose true conjugate was but two and a half inches. After losing three children the mother consented to operation. During the patient's seventh and last pregnancy she developed toxæmia which required treatment. The operation was rapidly performed, and consisted of incision of the abdomen, incision of the uterus, and closure by suture.

Two Fatal Cases of Pregnancy Complicated by Mitral Insufficiency.—In the *Boston Medical and Surgical Journal*, July 11, 1901, CHADWICK reports the case of a patient seven months advanced in her second pregnancy. When first seen she had marked dyspnœa and cough, with purulent and bloody expectoration. The heart action was very rapid, and a systolic murmur was transmitted to the axilla. The second pulmonary sound was extenuated. Under rest and tonics she greatly improved, but later œdema developed with toxæmia. She came into labor, and was delivered by forceps. Although very ill after delivery, with threatened heart failure, she gradually improved until the third week, when she died. The urine was scanty in amount, and loaded with albumin before death.

Case second was a primipara, who had a slight systolic murmur when first seen. During pregnancy a troublesome cough developed, with pronounced systolic mitral murmur and extenuation of the second pulmonary sound. In the sixth month of pregnancy her condition was so bad that it was impos-

sible to interfere. She very slightly improved, and finally was delivered of a stillborn child. She did not rally from labor, being mentally and physically greatly depressed, and gradually failed. In both of these cases treatment was followed by very temporary results, and even the termination of pregnancy seemed to be without effect.

Puerperal Phlebitis.—BOSSARD (*La Semaine Médicale*, June 5, 1901) draws attention to the fact that many cases of puerperal phlebitis are preceded by what he describes as benignant pulmonary embolism. The patient complains of very slight distress, has dulness over a portion of the chest, nausea and slight disturbance of circulation, with the development of moist râles and blood-tinged expectoration. The pulmonary signs gradually diminish, followed by the development of thrombosis in the veins of the lower extremities.

He has also observed a family predisposition to this complication, and describes the case of a woman and her two daughters and more distant relations who suffered from this complication. It is impossible to determine the exact germ which produces this condition, and while some cases are violently septic others are certainly not so, and run their course with but very little disturbance.

GYNECOLOGY.

UNDER THE CHARGE OF

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ASSISTED BY

WILLIAM E. STUDDIFORD, M.D.

Recurrence in the Abdominal Cicatrix.—SCHAEFFER (*Centralblatt für Gynäkologie*, 1901, No. 19) reports a case of recurrence of carcinoma in the cicatrix four and one-half years after double ovariotomy for malignant tumor of the ovaries, which he infers was due to inoculation during the operation. Metastasis is much more common after vaginal than abdominal operations. It is rare in the cicatrix after laparotomy, first, because spontaneous metastases seldom or never occur here, and, secondly, because the course of the lymphatics of the ovary is such as to render such metastases improbable. The reported cases of inoculation in the abdominal cicatrix may be divided into four classes, viz.: 1. Recurrence of benign neoplasms after the removal of similar tumors of the ovary. 2. Development of carcinoma following the removal of malignant ovarian growths. 3. Carcinomatous degeneration of the cicatrix accompanying nodules in the peritoneum. In these cases there is probably direct extension of the disease. 4. Cancerous recurrence in the abdominal cicatrix after the removal of cancerous ovaries, the peritoneum being healthy (as in the writer's case and four others). In the first two

classes one may infer the development of the secondary growth in consequence of inoculation of the abdominal wound during the operation, though they furnish no positive evidence in favor of the inoculability of cancer.

Emphysema of the Skin Following Cœliotomy.—MADLENER (*Centralblatt für Gynäkologie*, 1901, No. 19) reports four cases, making twenty-five which have been recorded. He believes that the complication is not so rare as is generally believed. It occurs after closure of the abdominal wound by the escape of air from the cavity between the layers of the wall, and has no connection with imperfect closure of the wound. Trendelenburg's posture favors the sucking of air into the cavity, and hence the occurrence of emphysema; hence the importance of lowering the patient to the horizontal position before closing the wound. Treatment is rarely required, though in exceptional cases multiple incisions may be necessary.

[This is certainly an exceedingly rare condition in this country. We have seen but one case, and can recall but two or three reports of others. —ED.]

Antipyrine and Salol as Styptics in Gynecology.—SPAETH (*Centralblatt für Gynäkologie*, 1901, No. 19) used these drugs in seventy cases of uterine hemorrhage with good results. Equal parts are liquefied by heating in a glass vessel, a cotton applicator is dipped in the solution, and the uterine cavity is swabbed out with it three or four times at intervals of from two to four days.

The solution is purely hæmostatic, having no bactericidal action, while cases of glandular endometritis and of gonorrhœal infection were not affected. Hemorrhage due to chronic inflammatory conditions of the adnexa, subinvolution, and abortion were controlled in 80 per cent. of the cases.

The writer infers that the effect of the application is chiefly thermic, and is due to contraction of the uterine muscles, since measurements of the cavity before and after the application showed a variation in depth of nearly half an inch. A slight amount of slough is seen in the cervix, but there is no cauterization of the endometrium. Hemorrhage from polypi and intramural fibroids is not diminished by the treatment; in fact, it is sometimes increased.

Resection of the Urethra in the Female.—DELAGENIÈRE (*Arch. prov. de Chirurgie*, 1900, No. 12) operates as follows: An incision is made around the meatus and is carried downward in the median line one-third of an inch. With blunt dissection either the mucous lining of the urethra or the entire thickness of the canal is freed, drawn outward, and removed above the diseased area. The distal edges are then united to the mucous membrane of the vestibule. If the urethra is prolapsed the incision is S-shaped, the lower half of the S being elliptical. This ellipse is excised with the prolapsed portion of the urethra, the sutures being introduced in the same way. No catheter is left *in situ*, though the patient is catheterized for a day or two.

Pelvic Abscess Communicating with the Bladder.—BAZY (*Revue de Gyn. et de Chir. Abdom.*, 1900, No. 6) arrives at the following conclusions

from a study of six cases: Pelvic abscesses adjacent to the bladder should be opened as soon as possible before irritation of the viscus is noted. Vesical irritability in this connection is an indication for immediate interference. After a pelvic abscess has ruptured into the bladder it is unwise to incise it per vaginam, as this may only lead to the development of an intractable vesico-vaginal fistula. If general infection is present or the pus cannot be thoroughly evacuated through the bladder, a vaginal incision is, of course, indicated.

Vesico-intestinal fistulæ following acute inflammatory conditions may heal spontaneously, though cœliotomy may be necessary.

[It is rather peculiar that no mention is made of cystotomy as the most natural method of draining the bladder and preventing infection of the upper urinary tract.—ED.]

Atmokausis.—STÖCKEL (*Therap. Monatshefte; Centralblatt für Gynäkologie*, 1901, No. 19) reports twenty-two cases of atmokausis according to the method of Pincus. He insists on the importance of thorough preliminary dilatation of the cervix, preferably with laminaria tents. In one case the life of the patient (a girl, aged fourteen years, a subject of hæmophilia) was undoubtedly saved by the treatment, though the uterine cavity was obliterated.

It is less apt to be successful in the treatment of hemorrhage due to fibroids, as the entire endometrium is not reached by the steam. In one instance the tumor increased in size after the application. The writer disapproves of atmokausis in cases of hemorrhage due to incomplete abortion. The results are most satisfactory in cases of glandular endometritis and climacteric bleeding.

SIMPSON (*Scottish Medical and Surgical Journal*, 1900, No. 6) treated fourteen cases of uterine hemorrhage by atmokausis, eleven patients being cured and the others relieved. The length of the seance varied from forty to ninety seconds, but the patients were anæsthetized. They were kept in bed from two to three weeks, and no complications were observed.

Injuries to the Vagina during Coitus.—BOHNSTEDT (*Centralblatt für Gynäkologie*, 1901, No. 22) reviews the literature of the subject, giving the details of a case in his own practice, showing that some other etiological factor for rupture of the vault of the vagina during coitus must be inferred, since in 70 per cent. of the reported cases the women were either not virgins or had borne children. If they were due to violence on the part of the male, they ought to be of common occurrence in prostitutes, which is not true. The histories show that in nearly every instance there was marked sexual excitement on the part of the female, which may cause a sudden increase in the intra-abdominal pressure, thus forcing the vaginal vault downward. This question may assume considerable medico-legal importance in cases of supposed rape, from its bearing on the voluntary submission or resistance of the female.

Ureteral Invagination.—GUBAROFF (*Centralblatt für Chirurgie*, 1901, No. 5) reports a case of hysterectomy for fibrosarcoma of the uterus in which an

inch of one ureter was excised. The distal end was invaginated into the lower end and was secured with longitudinal sutures, including the entire thickness of the ureteral wall. The patient succumbed from amyloid disease a month after the operation. At the autopsy the calibre of the ureter was found to be normal.

[We have reported a case in which a similar method of repair was adopted, with success, the patient being well two years after the operation.—Ed.]

Transplantation of the Ureter into the Rectum.—Alexandrow (*Jour. akusch. i. Shensk. Bolesnej.; Centralblatt für Gynäkologie*, 1901, No. 23) adopted this plan in the case of a long-standing rectovesical fistula, thirty unsuccessful attempts to close it having been made in the course of seven years. The entire anterior vaginal wall was destroyed and the bladder and portio so embedded in cicatricial tissue that all trace of their former appearance was lost.

Previous to the operation both ureters were catheterized. The abdomen was opened, the peritoneum over the ureters was incised, and the ducts were dissected out, ligated, and divided close to the bladder. The distal ends were then turned into the rectum in the usual manner. The operation was entirely successful.

Conservative Treatment of Diseased Adnexa.—Thomson (*Centralblatt für Gynäkologie*, 1901, No. 20) is strongly in favor of vaginal section instead of cœliotomy in all cases of abscess of the tube or ovary which can be reached through the posterior fornix. He believes that the most important point is the making of a large incision, followed by thorough evacuation of all the abscesses and free drainage. The results of this treatment are almost invariably satisfactory as regards the relief of pain, diminution of the inflammatory masses, and restoration to comparative health.

The Relation of Nasal to Pelvic Affections.—Schiff (*Wiener klinische Wochenschrift*, 1901, No. 3) confirms Fliess' statement that on either side of the nasal septum there are spots which constantly become congested, swollen, and highly sensitive during menstruation. Dysmenorrhœa can often be cut short by cocainizing these localities, and can be permanently relieved by the use of the cautery. The writer reports two hundred observations upon forty-seven subjects. All the women suffered from severe dysmenorrhœa, due in many instances to diseased adnexa. In 72 per cent. cocainization of the "genital spots" in the septum nasi relieved only sacral pains, while similar treatment of the lower muscles of the nose directly influenced pain in the abdomen. Twelve patients were permanently relieved by the use of the cautery.

Two drops of a 20 per cent. solution are applied on cotton. The writer adds that it may be entrusted to a layman (!).

Gynecological Examination from a Medico-legal Stand-point.—Calmann (*Centralblatt für Gynäkologie*, 1901, No. 20) calls attention to the importance of the fact that on account of the deficiency of the tactile sense in their pelvic organs women are unable to locate the exact spot which is

being touched with the finger or an instrument. Hence they are apt to confound catheterization of the urethra, scarification or sounding of the uterus, etc. On the other hand, a sound can be slipped into the uterus without the knowledge of the patient, or her vagina may be distended by a foreign body. This is well known to abortionists. Lesions may be caused by the examining finger in elderly or puerperal women, or deep tears may be produced by specula, all of which may be called to the attention of the medical expert.

Pelvic Hæmatocele Due to General Hyperæmia.—Sauter (*Zeitschrift für Heilkunde*, Band xxi., Heft 7) admits that while rupture of an ectopic sac is the most frequent, perhaps the sole cause of extensive pelvic hæmatocele, general hyperæmia of the pelvic organs may lead to intraperitoneal hemorrhage. Within three months he found at autopsy seventeen instances of excessive pelvic congestion, in seven of which free blood was found in Douglas' pouch. The only gross pathological change noted was thrombosis of the vessels of the peritoneum, with accompanying connective tissue hyperplasia. This origin of the indurated tissue was proved by microscopical examinations. Perimetric adhesions, he believes, are due not alone to infection (specific or septic), but occasionally to long-standing venous congestion. Clinically it is impossible to recognize this condition, as there are no characteristic symptoms.

OTOLOGY.

UNDER THE CHARGE OF

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Surgical Exposure of the Middle-ear Cavities in Chronic Otorrhœa.—The object of throwing all the middle-ear cavities into one is to bring about an essential or radical cure of the chronic suppuration. Its chief advantage over other forms of mastoid operation lies in the possibility it affords of removing more completely all macroscopically diseased tissue and subsequently to observe directly the exfoliation of those diseased portions not sufficiently demarcated at the time of the operation. "Even in those cases in which a permanent cure of the otorrhœa is not obtained by the operation a prophylaxis is given the patient by reason of the improved drainage afforded by the operation."

Panse and Leutert (*Archiv f. Ohrenh.*, vol. xlv.) maintain that *reinfection* of the cavities operated upon in and about the ears occurs through the Eustachian tube, and, therefore, they endeavor to cause the remnant of the membrana to adhere to the promontory, and thus cut off the passageway from the tube to the drum cavity. The latter advocates the method now adopted in Halle, of obliteration of the tympanic mouth of the Eustachian tube after radical tympanic operations in chronic otorrhœa.

Conical Perforations of the Membrana Tympani in Acute Purulent Otitis Media.—L. KATZ (*Archiv f. Ohrenh.*, December 3, 1900) demonstrates that the conical protuberance on the membrana tympani, marking the position of the perforation in some cases of acute otitis media, consists of densely infiltrated granulation tissue, covered with highly inflamed epidermis, and emanates from the mucosa of the tympanic surface of the membrana tympani. Through the long axis of such a cone runs a narrow canal, lined with a layer of epithelium similar to that covering the outer surface of the cone, showing that the epidermis of the membrana is invaginated into the perforation.

The causes of such a conical formation are: 1. A narrow, high-placed perforation. 2. Rather thick purulent or mucopurulent exudation. 3. A thick, relatively resistant, inflamed cutis layer in the drum-membrane. 4. An inversion of the epithelial edge into the narrow perforation, whereby the latter is still further narrowed.

The difficult escape of thick pus from the drum cavity causes sufficient irritation in the mucous surface of the membrana tympani to induce circumscribed granulation formation, with resultant destruction of the membrana propria at this point. The discharge, however, still finds hinderance to its escape, the yet resistant epidermis layer of the membrana, to cause it to push the latter ahead of it in a hernia-like protrusion. Such a condition tends to further close the narrow exit canal in the cone, and hinders the discharge of pus from the drum cavity.

The formation of such a cone on the membrana tympani in the course of an acute purulent inflammation of the middle ear threatens a retention of pus within the drum cavity, and must receive immediate attention. As soon as observed it should be cut open and dilated, as shown by Schwartze, and this leads in most cases to free outlet and prompt recovery.

In cases in which this method does not give relief to ease pain, fever, etc., if the cone is prominent enough it must be seized with a polypus snare or other suitable instrument, and removed as close to the membrana as possible.

A Case of Agoraphobia Mistaken for Ear-vertigo.—F. KRETSCHMANN (*Archiv f. Ohrenh.*, September 20, 1900, p. 61) reports a case of agoraphobia occurring in one of his patients, a man, aged fifty years, cured eight years before of chronic purulency localized in the attic of the left middle ear. The membrana tympani was destroyed. Vertiginous symptoms had often occurred. After several weeks the suppuration was checked, but the vertigo continued. In the following year the patient's ear was known to have remained healed and his general health had been good. Much to the surprise of Kretschmann the patient suddenly presented himself with his wife, stating that he was unable to walk alone for fear of falling. This condition had occurred suddenly a few weeks previous without any assignable cause, and had grown worse by degrees until its present degree had been reached. An examination of the ear had revealed shining epidermis everywhere, without a trace of pus or the presence of fetor. The patient presented an anxious expression of countenance, his attitude was bent over, and he seemed timid. When he was led through the room he showed no tendency to fall sideways. His gait was sliding, his feet not being lifted. Stand-

ing with feet together and eyes closed, there occurred no swaying. The patellar reflexes were normal. In trying to walk alone the patient shoved his left foot carefully forward and then drew the right one after it, like one crossing a narrow foot-bridge. With his hands he quickly sought a support.

In fact, the patient presented well-marked symptoms of ear-vertigo. The patient was assured, however, that his ear was in good condition, there were no signs of a recurrence of the purulency, and that his present condition of vertigo was not due to his ear, but was of a nervous nature. He was also assured that regular exercise would overcome his uncertain gait, and he was immediately told to take several long steps. This succeeded beyond expectation, and he walked better at every repetition of the exercise. Three days later he reported again in high spirits over the good results of his exercises in walking. He held himself erect and walked perfectly well and continued to do so therefrom. The good results in this instance can be ascribed to a form of suggestion or hypnotic treatment.

The Organ of Hearing in Purpura Hemorrhagica.—M. SUGAR (*Archiv f. Ohrenh.*, September 20, 1900), in an article on this subject, rejects the old theory that purpuric affections are due to a dissolution of the blood, and adopts the modern claim that purpura rheumatica and purpura hemorrhagica are of bacillary origin (Kolb, Letzerich, Jarisch *et al.*). He then describes a peculiar ear disease observed by him in a case of peliosis or purpura hemorrhagica in a man, aged twenty-eight years. In this man there was observed at the time of his admission to the hospital, in addition to numerous purpuric spots on the left extensor surface of his lower extremities, a distinct herpetic eruption on the left auricle, the hearing and the membranes on both sides being normal. Two days later there suddenly occurred intense and uncontrollable vomiting, lasting thirteen hours. There was no blood in the vomit. Simultaneously there occurred in the right ear intense tinnitus, accompanied by great vertigo and deafness. Bone conduction was entirely abrogated on the right side of the skull. The next day the right auricle was the seat of twenty-three purpuric eruptions, the face remaining entirely free. Hemorrhagic spots were seen in the external auditory canal, and two upon the membrana tympani near its periphery. After the appearance of this purpuric eruption in the auricle the vomiting, vertigo, tinnitus, and earache ceased, and the bone conduction was reinstated. Three days after this recovery the patient left the hospital, but returned the next day with a relapse in all the symptoms, both general and special. In twenty-four hours the subjective symptoms in the ear and head disappeared once more, the patient, however, remaining very anæmic. Sugar is disposed to attribute all the ear symptoms to hemorrhage into the labyrinth. [It seems, however, to us that a hemorrhage into the labyrinth extensive enough to produce the above-named aural symptoms could not have been absorbed so quickly as this appeared to be, if, in fact, it could ever have been absorbed to a degree sufficient to permit a restoration of hearing.] The treatment recommended in such cases as these consists in iron, quinine, and arsenical preparations.

Otogenous Pyæmia.—F. KRETSCHMANN (*Archiv für Ohrenh.*, September 20, 1900, p. 54) observed three cases of otogenous pyæmia, of which

the first was characterized by extensive thrombosis of the cranial sinuses; the second by the rapidity of development of the pyæmia, and the third by the complication of the pyæmia by endocarditis.

In the first case, a man, aged sixty-eight years, subject of chronic purulent otorrhœa, thrombosis began in the left side in the transverse sinus, and extended finally through the torcular and involved the right transverse, inferior petrosal, and cavernous sinuses, and the upper part of the right jugular vein. In this same case there was found during an exploration of the cerebellum for a supposed abscess an encapsulated collection of serous fluid, the nature of which was not explained, neither at the operation nor at the autopsy.

The second case, a boy, aged four years, is remarkable for the rapidity with which thrombophlebitis developed after an acute otitis media. Symptoms of pneumonic metastasis set in on the fourth day of the otitis. [This is another instance in which the ear disease in a child caused the pneumonia.]

In this case, as the drum cavity and the antrum showed very little change, the author supposes that in this child there occurred a metastasis by a leap and not by contiguity, such leaping method of formation of a suppuration far from the primary seat in the ear being not uncommon in otopathology.

In the third case, a boy, aged nine years, with foul chronic purulent otorrhœa, typical symptoms of pyæmia and endocarditis occurred, with remarkable variations in temperature, viz.: from 96° F. to 106° F., followed, however, by entire recovery of health. The bony cochlea was thrown off as a sequestrum in this case, six months after the first pyæmic symptoms; the aural discharge then ceased. The tuning-fork could be heard by bone conduction in the ear without a cochlea.

DISEASES OF THE LARYNX AND CONTIGUOUS STRUCTURES.

UNDER THE CHARGE OF

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Historic Records.—The studious DR. C. CHAUVEAU, of Paris, has just presented to his colleagues the first volume of a history of diseases of the pharynx, comprising the Greco-Roman and Byzantine and Arabic periods.

He begins with the fifteenth century, and presents abstracts and comments of the various authors, both on diseases and on remedies, in a few instances presenting the Latin text instead of a French translation. The Arabic section is represented by old translations in Latin.

The Relation Existing Between Diseases of the Conjunctiva, Nose, and Throat.—PROF. HEMAN H. BROWN, of Chicago, discusses this subject (*Journal of the American Medical Association*, June 15, 1901), showing that nervous, arterial, venous, and lymphatic connections are to be duly appreciated as well as the direct connection through the nasal duct.

Nasal Lesions after Middle Age.—Dr. George Coates (*London Lancet*, April 20, 1901), in a paper "On the Causation and Treatment of Profuse Epistaxis in People Beyond Middle Age," narrates five cases, three of them in women. None was traumatic, and several of them developed mitral or aortic regurgitation. In all of these cases the sequence of events which led up to the epistaxis was essentially the same, namely, long-continued high arterial pressure, with some cardiac failure from an over-filling of the venous system, and, finally, leakage from an over-distended vein.

Dr. Beaman Douglass (*New York Medical Journal*, May 25, 1901) read a paper on "The Nasal Condition Observed in the Aged," before the Section of Laryngology of the New York Academy of Medicine, in which he finds that the lesions in elderly people do not present anything like the distress they do in younger persons, and he suggests some theoretical considerations in possible explanation.

Primary Chancre of the Septum of the Nose.—Dr. W. Freudenthal, of New York, narrates a case (*New York Medical Journal*, May 11, 1901), at first mistaken for influenza, in the person of a physician who had conveyed the virus by picking his nose after a vaginal examination of a syphilitic subject. A summary of the literature on syphilis of the nose accompanies the article.

Saddle Nose.—Under a combined intranasal and extranasal operation for the correction of a congenital concave vertical and lateral deformity of the nose, Dr. Burton S. Booth, of Troy, N. Y., describes (*New York Medical Journal*, April 27, 1901) his procedure as successfully practised upon a young lady, aged eighteen years, who, with a lateral deformity from deviation of the septum, had a saddle nose deformity due to spreading and non-development of the nasal bones, with a like condition to some extent of the ethmoidal and sphenoidal bones. The procedure is very ingenious, but cannot be well condensed for these columns, and the interested reader is, therefore, referred to the original.

Malignant Intranasal Growth.—Dr. Broeckaert, of Gand, reports (*Revue Hebd. de Laryngologie, d'Otologie et de Rhinologie*, June 15, 1901) a case of polyp of the mucous membrane which underwent transformation into a lymphangiosarcoma or intralymphatic endothelioma. The case occurred in a man, aged sixty-two years, and is illustrated by engravings of microscopic appearances.

The tumor was removed by external access with the cold wire snare, curette, and forceps; and on the next day serious erysipelas of the face developed, and the patient died in two days.

A bibliography of twenty-seven additional cases follows.

Nasal Hydrorrhœa.—Dr. Augiéras, of Laval, reports (*Revue Hebd. de Laryngologie, d'Otologie et de Rhinologie*, June 29, 1901) a case of nasal hydrorrhœa of parotid origin following an operation for empyema of the maxillary sinuses. A salivary fistula had been left after operation which discharged

into the sinus. Upon thorough cauterization of its borders the rhinorrhœa ceased.

Syphilitic Hydrorrhœa of the Maxillary Sinus.—Dr. Augiéras reports (*Revue Hebd. de Laryngologie, d' Otologie et de Rhinologie*, June 29, 1901) a case in a woman, aged twenty-three years, with stigmata of hereditary syphilis. The hydrorrhœa of the maxillary sinus became developed at the same time that the bone suffered an access of syphilitic osteoperiostitis, and it subsided with the relief of the osseous lesion under antisyphilitic treatment.

Case of Sphenoidal Sinusitis.—Prof. H. Gaudier reports (*Revue Hebd. de Laryngologie, d' Otologie et de Rhinologie*, June 15, 1901) a case which occurred in a man, aged forty-one years. The sole symptom was headache. The diagnosis was suggested by pain produced by contact of the probe with the anterior nasal face of the sphenoidal sinus. The frontal and maxillary sinuses and the anterior and posterior ethmoidal cells were healthy. The case was cured by operative procedure, including preliminary removal of a spur of the septum and a hypertrophied inferior turbinate and the entire posterior portion of the middle turbinate, in order to gain access to the orifice of the sinus. This was dilated by rotating the canulated sound; the anterior wall of the sinus was then removed with the curette, which brought away considerable pus at each stroke. Relief was prompt, and the aperture made with the curette gradually diminished in size.

Cardiac Stricture of the Œsophagus Relieved by Dilatation from Below after Gastrostomy.—Dr. H. Alapy (*Archiv für klin. Chirurgie*, 1901, No. 4) reports a case of a child, aged seven years, with two strictures, the result of swallowing lye. The lower stricture, just above the cardia, could not be penetrated even with a filiform bougie. Gastrostomy was performed, and a week later an elastic bougie was introduced through the stomach up to the stricture. A silk catheter was then passed over it and the bougie withdrawn, after which a filiform bougie was passed through the stricture and out by the mouth. Dilatation was readily accomplished, and the child recovered.

Œsophagotomy.—Mm. Pierre Sebileau and E. Lombard report (*Annales des Mal. de l'Oreille, du Larynx*, etc., January, 1901) a successful external œsophagotomy upon an infant, aged three years, who had swallowed a sou piece twenty-four hours before the operation. The presence and position of the foreign body had been determined by radiography.

Parotitis.—An additional case of parotitis in pneumonia has been reported by Dr. George William Norris (*Philadelphia Medical Journal*, April 27, 1901) in a man, aged fifty-eight years, just recovering from a right-sided croupous pneumonia. The parotitis was on the left side, and incision became necessary on account of suppuration.

There is a bibliographic record of seventeen other cases, most of them reported in the same journal.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

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The Question of Experimental Granulomata.—KONSTANTINOWITSCH (*Virchow's Archiv*, 1901, vol. clxiii. p. 120) was induced on account of De Meser's case (cf. *supra*) to try the effect of injecting lycopodium spores into animals. He inoculated rabbits. In one case an abscess was produced. In another animal two firm nodules were formed, which reached the size of a hazel-nut after twelve days. One nodule was excised and examined after eighteen days; the other after forty-five days, when it had begun to diminish in size.

The first nodule was composed of proliferated connective tissue and endothelial cells, with numerous giant-cells. Lycopodium spores were present in large numbers, often in the protoplasm of giant-cells. The nodule itself was a granuloma due to the reaction produced by a foreign body.

The second nodule showed the same structure as the first, except that the granulation tissue was denser and more fibrillated.

R. Martin has injected lycopodium spores into the veins of animals, and found in the lungs small nodules composed of "embryonal cells"—*i. e.*, granulomata.

Numerous observers have injected blastomycetes into animals and produced granulomata. Hence one must be very cautious about accepting the conclusions of men who claim that blastomycetes are the cause of cancer.—E. H. N.

The Parasitic Theory of Cancer.—BORREL (*Annales de l'Institut Pasteur*, 1901, vol. xv. p. 49) gives an excellent brief review of the literature on the theory of the parasitic origin of cancer. He divides the work into three stages: 1. "Parasites" described by Neisser, Darier, and others, and believes that their "parasites" were epithelial cells undergoing special changes. 2. "Parasites" of the type described by Thoma, Sawtchenko, and others. These are intracellular bodies, round, single, or multiple, occurring chiefly within carcinomatous epithelium of glandular type. These bodies show a superficial resemblence to certain stages in the development of coccidia. Borrel believes that these bodies arise from peculiar changes which occur in the attractive sphere and centrosome of carcinoma cells. 3. "Parasites" believed by some men to be blastomycetes. Borrel says that the men who believe in this theory have assumed that all sorts of cell inclusions with a circular outline are blastomycetes, while in fact the inclusions have no morphological likeness to blastomycetes, and the infinite variety of cell inclusions even in carcinoma cannot all arise in the same way. The objections to the blastomycetic theory are: the nodules produced in animals by inoculation with blastomycetes are, with the exception of two cases of

Sanfelice (cf. *infra*), of mesoblastic type; most men, with decent asepsis in making cultures, do not obtain cultures of blastomycetes from carcinomata, and there is no evidence that yeasts are found within epithelial cells. Borrel analyzes Sanfelice's two "successful" cases, and decides that there is no evidence that the tumors were due to the action of blastomycetes.

Borrel's own contribution is a demonstration of the fact that bodies morphologically identical with the "parasites" of cancer are produced in normal and carcinomatous cells by certain peculiar changes in the attractive sphere and centrosome. He employs special technique in hardening and staining tissues. In the testicle of guinea-pigs the attractive sphere and the centrosomes of cells which are to become spermatozoa show stages of development in which they resemble the "parasites" seen in cancer cells. In the cells of carcinoma the attractive sphere with included centrosomes may give rise to exactly similar appearances. At times there comes a collection of portions of the sphere about each of several centrosomes, producing appearances like those seen in the "spore cyst" of various believers in the parasitic theory.

Hence, Borrel concludes that the so-called "parasites" are due to peculiar changes of the attractive sphere about the centrosome. He says that the theory of a parasitic cause is attractive, but that at present there is no evidence to support any of the theories.

Borrel's article is an excellent *résumé* of the status of the parasitic theory. His own work is very conclusive. The reviewer has seen his specimens, and can vouch for the accuracy of the plates.

[The three preceding articles are valuable additions to the literature that is accumulating to show that at present there is not the slightest evidence to prove that the peculiar bodies seen in epithelial cells of carcinomata are "parasites" of any sort—bacterial, coccidial, or blastomycetic. We are no nearer a demonstration of the cause of epithelial malignant tumors than before, and, if a parasitic cause ever is demonstrated, it will be along lines different from those pursued during the past ten years.]—E. H. N.

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